Water
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2018
Market Intelligence Report
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GreenCape

GreenCape

GreenCape is a non-profit organisation that drives the widespread adoption of economically viable green economy solutions from the Western Cape. We work with businesses, investors, academia and government to help unlock the investment and employment potential of green technologies and services, and to support a transition to a resilient green economy.

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Image courtesy of: Bruce Sutherland

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List of acronyms and abbreviations

B-BBEE	Broad-based Black Economic Empowerment
CCA	Customs-Controlled Area
CCCI	Cape Chamber of Commerce and Industry
CoCT	City of Cape Town
CSAG	Climate System Analysis Group
DEADP	Department of Environmental Affairs and Development Planning
dti	Department of Trade and Industry
DWA	Department of Water Affairs (now DWS)
DWAF	Department of Water Affairs and Forestry (now DWS)
DWS	Department of Water and Sanitation
EME	Exempted Micro Enterprise
GA	General Authorisation
GDP	Gross Domestic Product
GVA	Gross Value Add
MAR	Managed Aquifer Recharge
MFMA	Municipal Finance Management Act
MIR	Market Intelligence Report
MLD	Megalitres (million litres) per day
MPA	Marine Protected Area
NBR	National Building Regulations
NRW	Non-Revenue Water
NWA	National Water Act
O&M	Operations and Maintenance
PACE	Property Assessed Clean Energy
PAYS	Pay As You Save
PPP	Public Private Partnership
QSE	Qualifying Small Business Enterprise
RFQ	Request for Quotation
SANS	South African National Standard
SEZ	Special Economic Zone
SUDS	Sustainable Urban Drainage Systems
TCTA	Trans-Caledon Tunnel Authority
VAT	Value Added Tax
WCWSS	Western Cape Water Supply System
WC	Western Cape
WCWDM	Water Conservation and Water Demand Management
WEF	World Economic Forum
WMA	Water Management Area
WRC	Water Research Commission
WUL	Water Use Licence
WWF	World Wide Fund for Nature
WWTW	Waste Water Treatment Works

Conversions

1 Megalitre = 1 million litres = 1 000 kl = 1 000m^3

Executive summary

This market intelligence report (MIR) is aimed at investors interested in the South African urban water sector, with particular emphasis on the Western Cape region.

The current drought and the expected longer term water constraints in the region are key drivers for investment in this sector. The demand for technologies and services that enable resilience to water scarcity has substantially increased across all urban markets, and new **investment opportunities** have opened up in four key areas:

- **water metering and monitoring**
- **water efficiency**
- **water reuse**
- **alternative water supply**

The drought has placed considerable strain on water resources across the province, leading to **risks of insufficient supply**, business shutdown, financial losses and retrenchments. In addition, **water restrictions** are becoming more and more stringent across the province, and businesses and residents are under increasing pressure to reduce their demand of municipal water supply. The drought has also resulted in municipalities procuring **emergency augmentation supplies**, and re-assessing their longer term plans for drought resilient supply options.

As a result, numerous opportunities have been identified:

- The demand for **smart water metering** systems is increasing across the private sector, as a tool for improved water management in the context of the drought.
- The potential market for Water Conservation and Water Demand Management (WCWDM) projects that reduce **non-revenue water** in South African metros is estimated at ~R2 billion a year, of which ~R500 million is unfunded (DWS & SWPN 2015b).
- **Water reuse in the industrial sector** presents opportunities for both technology and service providers. The total Gross Value Add (GVA) for moderate and highly water intense users in the WC in 2016, excluding agriculture, was R155 billion (Quantec 2017).
- New residential and commercial property developments in the province are a key market for **water efficient devices and greywater reuse systems**, presenting a potential market of ~R900 million per year.
- Municipalities are increasingly interested in **potable water reuse** of their municipal wastewater. In Cape Town there is a potential market of around R2 billion.
- There are a number of opportunities relating to **groundwater** and **rainwater systems** across all private sector markets. The potential residential market in the Western Cape could be worth ~R5.8 billion.
- **Large-scale seawater desalination** is an emerging market that presents a number of opportunities for investors. Globally, equity returns in desalination projects are typically at least 14%, with higher returns (up to 18%) expected in higher risk countries.

Some general barriers to these opportunities include:

- **Public perceptions** can prevent market growth, particularly in the case of water reuse.
- **Property leasing** creates complexity around implementing water-related projects.
- There is currently a **shortage of qualified plumbers** experienced in installing alternative water supply systems.
- **Capital costs** are often a constraint, particularly in the residential market.

The municipal sector also has a number of barriers specific to this market, which relate to **access to funding, capacity constraints, municipal creditworthiness, and procurement processes.**

Both the general barriers and some of municipality-specific ones also represent opportunities for investors. They suggest good prospects in the Western Cape, and more widely in South Africa, for investment in technologies that enable resilience to drought and adaptation to longer-term water scarcity.

What's new?

Since the publication of the 2017 Water Market Intelligence Report (MIR) there have been substantial developments in investment opportunities in the urban water sector in the Western Cape. The drought has had a severe impact on business, has resulted in water restrictions, and has led to efforts by the private sector and municipalities to avoid acute water shortages. This has opened investment opportunities for technologies and services that enable resilience to drought and longer-term water constraints caused by climate change. This year's report focuses specifically on these investment opportunities.

Readers of last year's MIR are encouraged to read this year's report in full, as the market intelligence has been updated substantially.

1 – Introduction and purpose

This market intelligence report (MIR) has been compiled by GreenCape's Water Sector Desk. It is aimed at investors interested in the South African urban water sector, with particular emphasis on the Western Cape region.

Water scarcity is currently a key driver for investment in this sector in the Western Cape due to the current drought and the expected longer-term water constraints in the region. This year's report focuses on the immediate opportunities in four key areas (Figure 1) that promote drought resilience by reducing reliance on supply sources traditionally dominated by surface water. These opportunities relate specifically to a) water metering and monitoring, b) water efficiency, c) water reuse and d) alternative (non-traditional) water supply.

Alternative water supply includes groundwater, rainwater and desalinated seawater. More general information on the South African water value chain, water policy and governance, and wider value chain opportunities can be obtained from GreenCape's 2017 Water MIR.

The report provides a **sector overview** (Section 2), which outlines the issue of water scarcity in both the South African and Western Cape context. This is followed by an overview of **policies and regulations** (Section 3) that are relevant to water scarcity related investment **opportunities and barriers** (Section 4). The final sections outline various **finance and investment incentives** (Section 5), present the case for the **Western Cape as a potential greentech** hub for Africa (Section 6), and explain **GreenCape's work within the green economy** (Section 7).

There is a strong link between agriculture and water, particularly in water constrained contexts. For investment opportunities in the agricultural sector, including technology opportunities for improved water efficiency, please consult the 2017 and 2018 Agriculture Market Intelligence Reports[1], as well as the GreenAgri[2] portal.

While every effort has been made to ensure the information in this report is correct and as up to date as possible at the time of publishing in February 2018, readers should be aware that the market is changing rapidly. For up-to-date market information, please visit GreenCape's drought support webpage[3].

Figure 1: Opportunities to reduce reliance on traditional surface water supply

1 | www.greencape.co.za/market-intelligence
2 | www.greenagri.org.za
3 | www.greencape.co.za/content/focusarea/drought-business-support

2 – Sector overview

Water scarcity is a major challenge in South Africa that also represents a substantial opportunity for investors and businesses in the water sector.

The section provides an overview of the sector in the South African and the Western Cape contexts with the focus on aspects relevant to water scarcity.

2.1. South African context

The 'water crises' challenge was ranked by the World Economic Forum (WEF) as the third highest risk for doing business in South Africa in 2017, and is also one of the top risks globally (WEF 2017). South Africa is ranked as the 30th driest country in the world. It is a highly water-stressed country, with extreme climate and rainfall fluctuations (WRI 2015). Despite being a water-scarce country, consumption is around 233 litres/capita/day (l/c/d), compared to the international benchmark of around 180 l/c/d (DWS 2017a)4. South Africa has a reliable yield (i.e. the supply from current infrastructure) of around 15 billion m^3/year (at 98% assurance of supply), of which the majority is from surface water (68%) and return flows that support surface water (13%), as shown in Figure 2 (DWS 2017b).

Current usage is estimated to be 15-16 billion m^3/year, and in many water supply systems the water usage exceeds the reliable yield (DWS 2017b). This essentially means that while the water supply sources can meet this increased usage, the assurance of supply is less than 98%. Thus water shortages are likely to be experienced more often than two out of every 100 years. As indicated in Figure 3, agriculture is the largest water-use sector (62%), followed by municipal water use (27%), which includes residential, commercial and industrial users supplied by municipalities (DWS 2017b).

The relative proportion of urban and agricultural use differs between provinces and municipalities, depending on settlement patterns and the local economy.

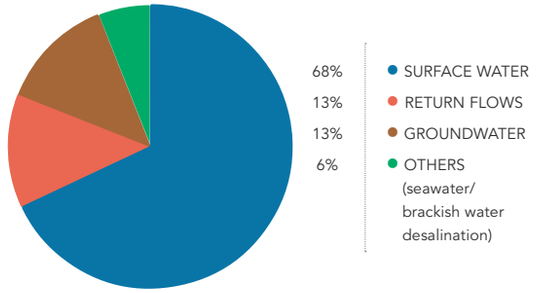

Figure 2: Water sources in South Africa

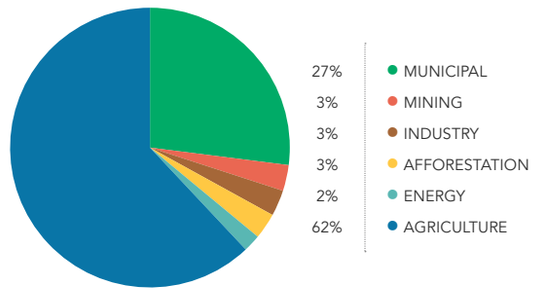

Figure 3: Water use in South Africa by sector

4 | These figures are based on the system input volume divided by the population served. The system input volume includes commercial and industrial demand and water losses through infrastructure leaks, etc.

Water demand in South Africa is expected to exceed supply by 17% in 2030, with demand expected to grow from 15 billion m^3 in 2016 to 18 billion m^3 over this period (WWF 2017).

Over the next 10 years, R70.4 billion of investment in national water infrastructure will be needed

In order to address water scarcity and provide reliable water to all people, businesses and industries in South Africa, it is estimated that over the next 10 years an investment of around R70.4 billion is required each year in water infrastructure (DWS 2017b). This includes refurbishing and upgrading existing infrastructure, as well as new infrastructure to support population and economic growth. However, with a budgeted funding of only R43.4 billion in 2017, there are significant shortfalls in available funding within the public sector (i.e. R27 billion in 2017) for water infrastructure, as shown in Table 1 (DWS 2017b).

2.2. Western Cape context

The Western Cape Province, in the south-west corner of South Africa, falls predominantly within two water management areas (WMAs), the Breede-Gouritz and the Berg-Olifants (Figure 4). Irrigation to support agriculture is the major water use in these two WMAs, followed by urban water use[5], as shown in Figure 5 (StatsSA 2010).

Table 1: Required and available public sector funding for water services infrastructure in 2017

Water Services Infrastructure Elements	Required Funding (R bn)	Budgeted Funding (R bn)
Municipal water infrastructure	27.8	17.1
Regional bulk (potable) infrastructure	10.1	7.4
Regional bulk (non potable) infrastructure	7.0	4.0
Water resources infrastructure	25.5	14.9
Total water infrastructure	70.4	43.4
Sanitation infrastructure	19.5	13.2
Total water services infrastructure	89.9	56.6
Funding shortfall	33.3	37%

5 | Urban water use includes the residential, commercial and industrial use of water supplied by the municipality, whereas bulk industrial refers to mining and industrial use that is not part of urban systems.

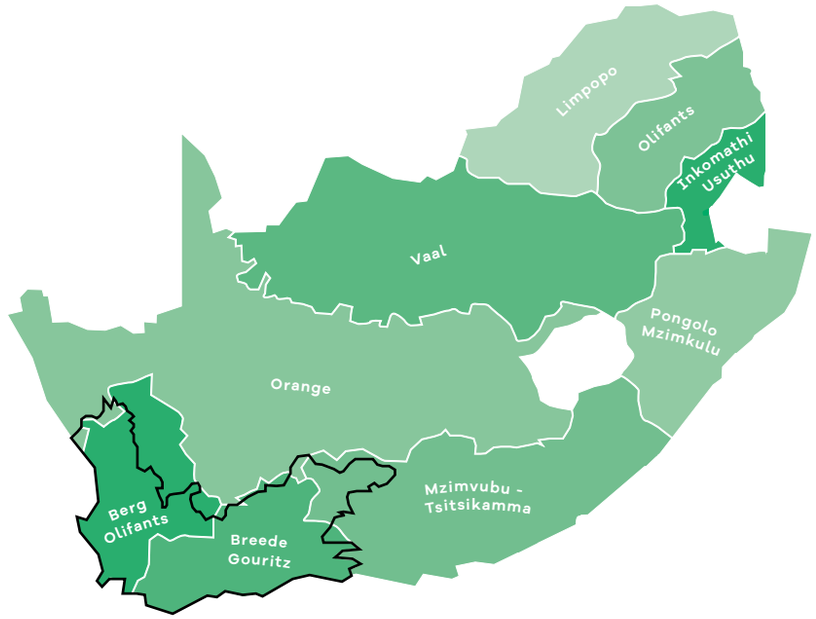

Figure 4: Water Management Areas in South Africa (Western Cape outlined in black)

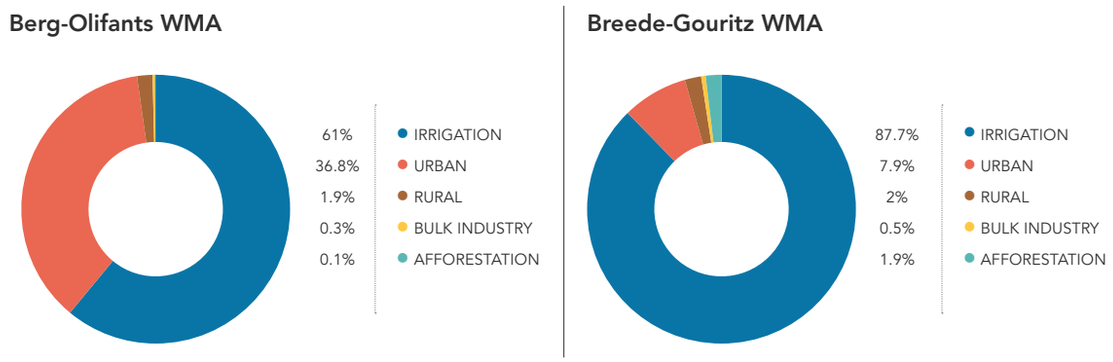

Figure 5: Water use by type for the two main Western Cape water management areas[6]

6 | This figure gives an indication of the relative proportions of water use in the two WMAs. The exact quantities will fluctuate depending on a number of factors, including water restrictions and curtailments

Short- and long-term water constraints create significant private sector investment opportunities in the Western Cape's urban water sector.

The province is currently drought-stricken and water scarcity is a significant challenge. In May 2017, the entire province was declared a disaster area. The Western Cape Government regularly assesses the level of risk of each municipality. Figure 6 indicates the risk status in November 2017. For more up to date information, please consult the Western Cape Government website[7].

As in the rest of South Africa, the short- and long-term water constraints in the province represent significant private sector investment opportunities in the region's urban water sector.

Figure 6: Drought status of Western Cape municipalities (February 2018)

2.2.1. Western Cape Water Supply System

The Western Cape Water Supply System (WCWSS), which supplies water to several municipalities within the Berg-Olifants WMA, is one of the most important supply systems in the country. It supplies water to a region that produces 84% of the province's gross domestic product (GDP) and approximately 11% of national GDP (Quantec 2017).

As shown in Figure 7, the WCWSS is a complex, interlinked system of dams, pipelines and distribution networks that supplies water to CoCT, West Coast District Municipality (which supplies water to Swartland, Saldanha Bay and Bergrivier local municipalities), Stellenbosch Local Municipality and certain agricultural users.

In 2014/15 the total annual consumption within the WCWSS was estimated at 547 million m^3. The total water allocation for the system is 609 million m^3 per year. Figure 8 provides a breakdown of allocation by end user.

7 | www.westerncape.gov.za/general-publication/latest-western-cape-dam-levels

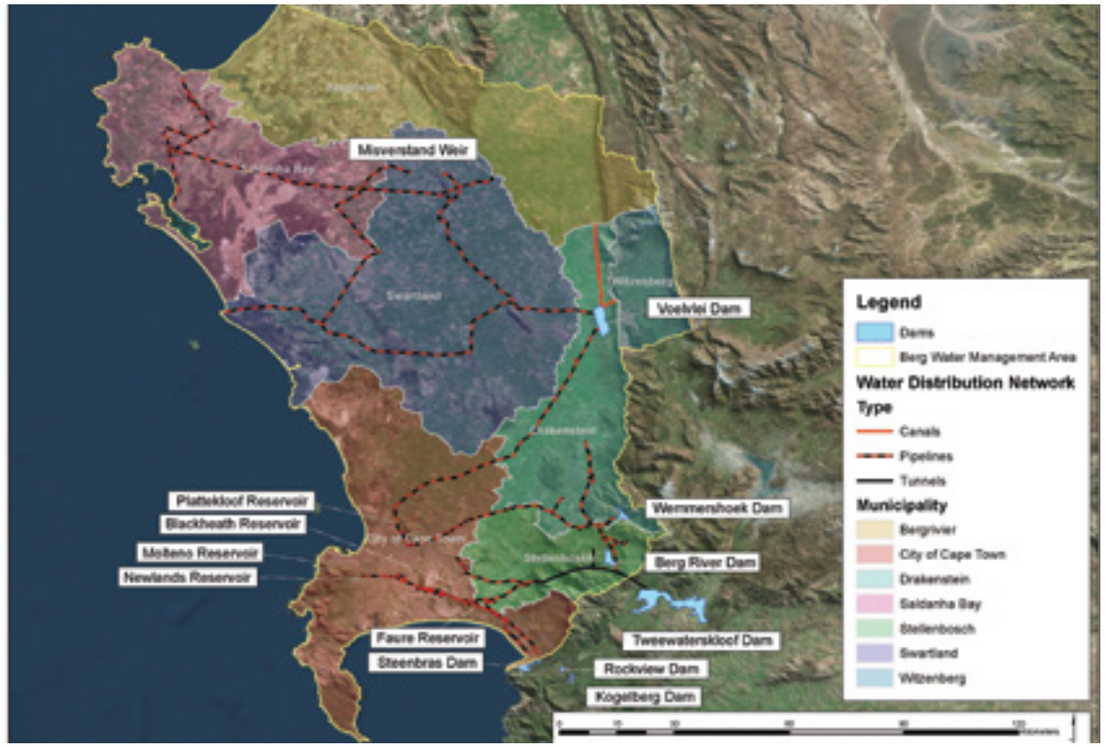

Figure 7: Municipalities supplied by the Western Cape Water Supply System (WCWSS)

As shown in Figure 7, the WCWSS is a complex, interlinked system of dams, pipelines and distribution networks that supplies water to CoCT, West Coast District Municipality (which supplies water to Swartland, Saldanha Bay and Bergrivier local municipalities), Stellenbosch Local Municipality and certain agricultural users.

In 2014/15 the total annual consumption within the WCWSS was estimated at 547 million m^3. The total water allocation for the system is 609 million m^3 per year. Figure 8 provides a breakdown of allocation by end user.

Approximately two-thirds of the allocation is for urban use (including residential, commercial and industrial use), and the remainder is allocated for irrigation – which is used in the summer months (DWS 2015).

Even without making provision for the ecological reserve, the total allocations exceed the system yield of 582 million m^3 per year. There are no further opportunities to build additional large dams to augment the supply (DWS 2015). Consequently, even prior to the drought, the system was considered to be relatively constrained.

The drought, which is linked to below-average rainfall, particularly in 2016 and 2017 (CSAG 2017), has placed additional strain on the WCWSS. The accumulated daily rainfall at Cape Town Airport is shown in Figure 9. The latest rainfall information can be accessed from the University of Cape Town's Climate System Analysis Group (CSAG) webpage[8]. Figure 10 shows that the levels of the six largest dams in the WCWSS are considerably lower than in previous years (CoCT 2018a). The last 10% of water stored in the dams is difficult to access.

8 | www.csag.uct.ac.za/current-seasons-rainfall-in-cape-town

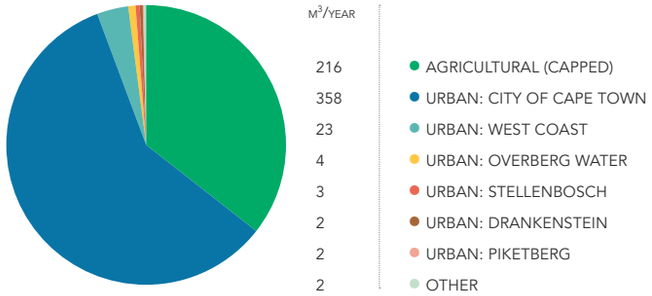

Figure 8: Overview of WCWSS allocations by type

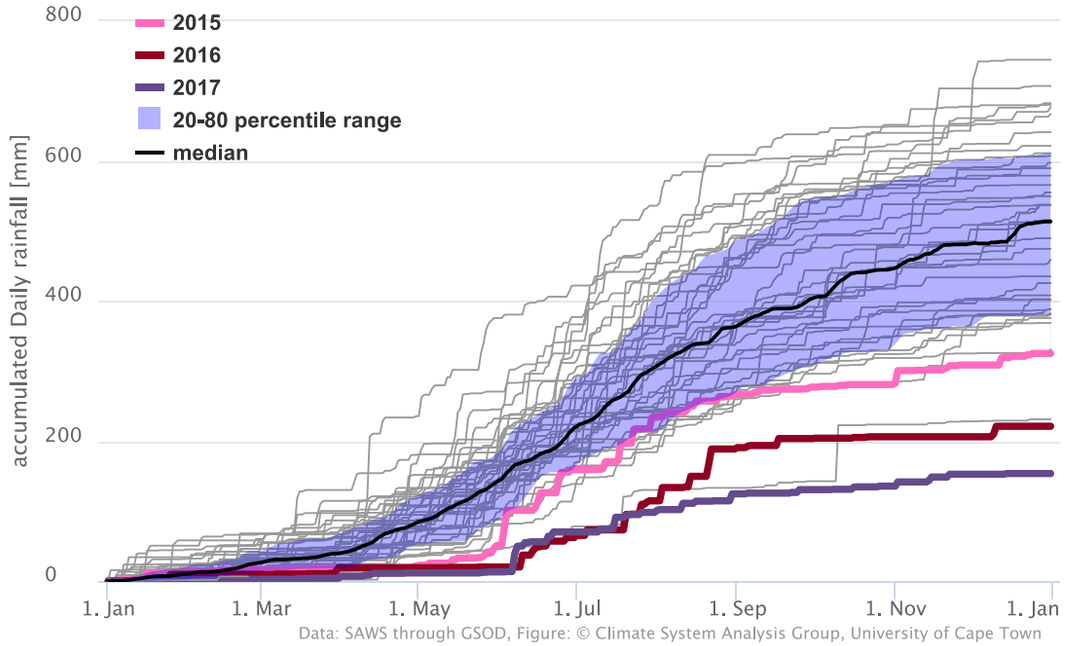

Figure 9: Accumulated daily rainfall at Cape Town Airport

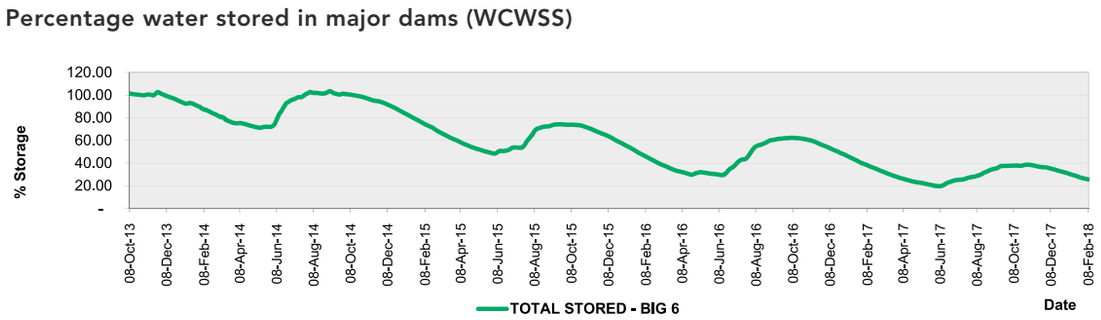

Figure 10: Water availability in the six largest dams in the WCWSS[9]

9 The six largest dams in the WCWSS are the Theewaterskloof, Voëlvlei, Berg, Wemmershoek, Steenbras Lower and Steenbras Upper dams. This information is regularly updated and can be accessed at www.capetown.gov.za/Family%20and%20home/residential-utility-services/residential-water-and-sanitation-services/this-weeks-dam-levels

Table 2: City of Cape Town's water augmentation programme

Augmentation Projects[10]	MLD[11]	Timeframes
Short-term temporary desalination		
Strandfontein	7	Full production May 2018
Monwabisi	7	Full production May 2018
V&A Waterfront	2	Full production March 2018
Groundwater		
Cape Flats aquifer	~80	Underway, incrementally ramping up to an average demand of 55MLD, peaking at ~80MLD
Atlantis aquifer	~25	5 MLD already refurbished in the system, a further ~20 MLD underway
Table Mountain Group aquifer	~75	Underway, incrementally ramping up to an average demand of 64MLD, peaking at ~75MLD
Potable Water Reuse		
Zandvliet WWTW[12]	10	10 MLD by June 2018
Other	~75	Investigating permanent reuse in the order of 75MLD
Permanent desalination		
Site to be confirmed	120-150	Optimum site is being explored. Pilot (20 MLD) being constructed at Koeberg.
Other		
Albion spring	3	Operational
Oranjezicht spring	1	Operational
Water transfers		8 million m^3 is being transferred from the Groenland Water User Association in the first half of 2018. Further transfers under investigation.

10 | This is the anticipated programme as of March 2018, and is subject to change.
11 | MLD = million litres per day
12 | WWTW = Wastewater treatment works

In response, the CoCT, which historically relied on the WCWSS for 98% of its supply (CoCT 2017a), initiated a water resilience portfolio response. This includes various measures to further decrease water demand (including reduced water pressure, more communication campaigns, increased water restrictions and fines, and the installation of water management devices on non-compliant residential properties). As shown in Table 2 (CoCT 2018b), the City is also in the process of procuring alternative water supply from various sources, including groundwater, seawater desalination and potable water reuse.

In Saldanha Bay, where industrial and commercial water use accounts for around 60% of the total municipal water consumption, the municipality is working with the large water users to jointly address water constraints in the region. Through water efficiency and reuse measures, the demand for municipal water has reduced from around 41 MLD in 2015 to 37 MLD in early 2017 (before water restrictions) and then further to around 28 MLD in late 2017, once restrictions were in place. The large water users include three smelter-type manufacturing facilities located near the Port of Saldanha, collectively using 7-8 MLD, and four fish processing factories (three of them in St Helena Bay), using around 2.5-4 MLD. Groundwater abstraction, upgrading treated effluent, industrial wastewater reuse and seawater desalination, are among the options being explored and procured by both the municipality and the companies themselves.

Stellenbosch Municipality, which has been on Level 5 water restrictions since September 2017, has reduced its consumption (of municipal water) from 38 MLD to 25 MLD, as of December 2017. Of the 25 MLD, ~23 MLD is urban use and ~3 MLD is rural use. In addition to various demand-side measures, augmentation interventions have also been initiated to increase the water supply, mainly by adding to the existing 30 boreholes that extract water from the Stellenbosch aquifer.

Most of the remaining municipalities are looking at groundwater to supply their emergency and long-term requirements.

2.2.2. Long-term planning

The current drought can only be broken with 3-4 years of above-average rain, and the effects of the drought are long term. The climate projections for the Western Cape indicate a warming trend as well as projected drying in many areas, with longer time periods between increasingly intense rainfall events (DEADP 2014). Population and economic growth will place additional burden on water supply systems, which in turn will have a negative impact on the province and consequently the country's economy, and particularly the contribution of the agricultural sector[13]. It is therefore likely that water scarcity will continue to be a challenge in the province in the long term, and has been termed 'the new normal'.

Reconciliation strategy studies forecast future demand and then provide recommendations on how to reconcile the gap between demand and supply by developing new water resources or reducing demand. These recommendations form the long-term reconciliation strategies of municipalities.

Figure 11 presents the reconciliation strategy for the WCWSS under the 'planning scenario'[14] from the latest publicly available data on the WCWSS Reconciliation Strategy (2015). Solid lines show water demand projections (high growth scenario = yellow and low growth = blue) with the red solid line indicating current usage. Solid fills show the planned water supply interventions, along with their height (or stacked thickness) indicating the estimated yields for the different interventions.

13 | The GVA of agriculture in the Western Cape is R18.6 billion (which is 22% of South Africa's agricultural GVA) and export revenues exceed R40 billion per year. Around 216 000 people are employed in primary agriculture and 250 000 employed in agri-processing in the province (WCG 2017).

14 | The 'planning scenario' assumes that the City of Cape Town achieves 50% of its WCWDM strategy, that climate change does not impact water availability, and that the ecological reserve has not been implemented.

The strategy is expected to be revised in the near future. Planned interventions may change, along with a potential recalculation of system yield on the basis of the current drought experience. Nevertheless, the strategy gives an indication of the interventions being considered and planned for the WCWSS. These interventions include potable water reuse (from wastewater treatment plants), groundwater development (new resources and artificial recharge) and large-scale permanent seawater desalination. In this regard, long-term plans have already been in place for several years. Many of the planned projects are now being fast-tracked and re-assessed, e.g. through the CoCT's water resilience water augmentation programme.

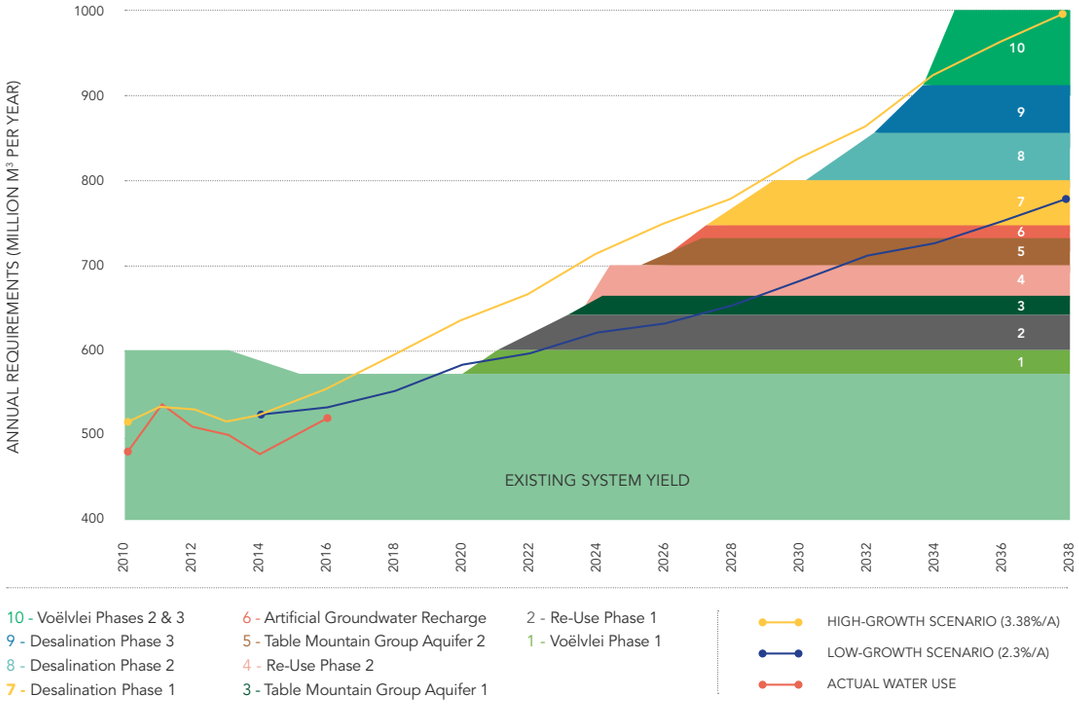

Figure 11: WCWSS planning scenario reconciliation of supply and demand

3 – Policies and regulations

There are a number of laws and regulations that are relevant to the opportunities in the water sector.[15]

3.1. National legislation

3.1.1. The National Water Act

National legislation provides the framework of law that is to be applied throughout the country. **The National Water Act (NWA) of 1998** is the key legislation that regulates and protects water resources and has effectively transferred all water ownership to the state. Water is a national competence, and the primary responsible authority is the Department of Water and Sanitation (DWS).

The Act regulates 11 different 'uses' of water, such as taking water from a resource, storing water, and discharging waste or effluent into a water resource. It stipulates that no person can use water without a water use licence unless:

- it is permissible under Schedule 1 of the Act (such as reasonable domestic use, non-commercial irrigation, and roof-top rainwater harvesting);
- it is a continuation of an existing lawful use;
- it is in terms of a general authorisation (GA); or
- the responsible authority has dispensed with the requirement for a licence.

The above is particularly relevant to alternative water supply projects, including groundwater use. Residents are typically allowed to use groundwater on their properties for reasonable domestic use without a licence (as per Schedule 1 of the NWA)[16]. Businesses that want to use groundwater must either register the use(s) under a general authorisation with DWS (which typically takes a few weeks) or must apply for a water-use licence with DWS (which takes up to 300 working days).

In order to qualify for GA registration, the user must comply with all the conditions listed in the relevant GA. For example, in the case of the GA for the Taking and Storing of Water (published 2 September 2016), one of the conditions limits the volume of water that can be abstracted per year. Figure 12 shows the maximum abstraction rates for the Western Cape for this GA[17].

Seawater desalination does not require permission from DWS for abstraction, provided it is not in an estuary or river mouth. Similarly, the discharge of brine in the ocean does not require permission from DWS. However, a coastal water discharge permit is required from the Oceans and Coasts Branch[18], Department of Environmental Affairs.

3.1.2. The National Building Regulations and Building Standards Act

In terms of design and construction, water systems must be consistent with the National Building Regulations (NBR) SANS 10400. The NBRs fall under the **National Building Regulations and Building Standards Act** (Act 103 of 1977), which governs all building and construction work in South Africa. However, no chapter of the SANS 10400 regulations deals directly with water installations in buildings other than those relating to fire installations. Although it is intended that SANS 10400-XB will cover **water efficiency** in buildings, this section has not yet been developed.

15 The section does not comprehensively cover all legislation relevant to the opportunity ares (water monitoring, efficiency, reuse and alternative water supply). Instead, it highlights key information that may be useful to potential investors.
16 However, municipalities may still require the registration of boreholes or wellpoints, see Section 3.2.3.
17 In addition to these limits, no more than 40 000 m^3 may be taken in terms of the general authorisation per year on a property, regardless of location.
18 www.environment.gov.za/branches/oceans_coast

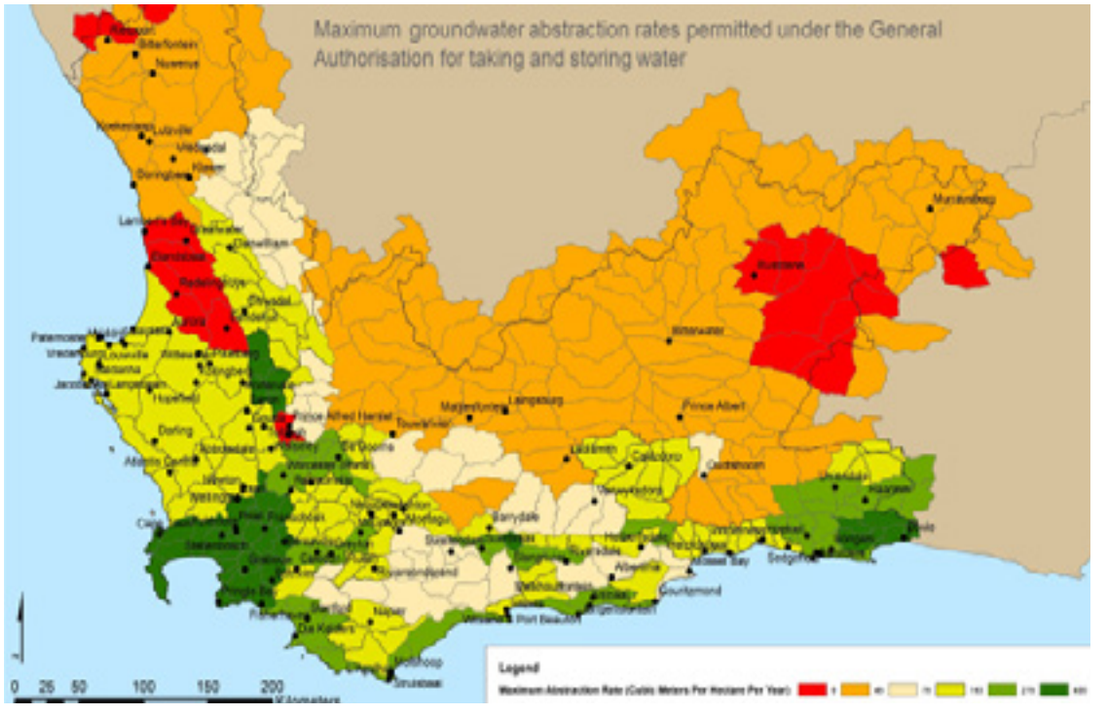

Figure 12: Maximum abstraction rates permitted under the General Authorisation for Taking and Storing Water (2016)

3.1.3. Other key national legislation and standards

Some of the other key national laws and regulations that may be relevant to projects in the water sector include:

- **Water Services Act**, Act 108 of 1997 (relevant to the regulation of water and sanitation services provided by municipalities)
- **South African National Standard for Drinking Water** (SANS 241: 2015)
- **Legal Metrology Act**, Act no 9 of 2014 (relevant to smart metering)
- **National Environmental Management Act**, Act 107 of 1998 (relevant to environmental authorisations)

It should be noted that during emergency situations (e.g. disasters due to drought) certain authorisations can be fast-tracked or are no longer required. For example, Section 30A of the National Environmental Management Act of 1998 states,

"The competent authority may on its own initiative or on written or oral request from a person, direct a person verbally or in writing to carry out a listed or specified activity, without obtaining an environmental authorisation contemplated in section 24(2)(a) or (b), in order to prevent or contain an emergency situation or to prevent, contain or mitigate the effects of the emergency situation."

Further information can be obtained from the responsible authorities.

3.2. Municipal by-laws and tariffs

Municipalities have the constitutional competence to enact laws (known as by-laws) in respect of water and sanitation services.

The Department of Water Affairs and Forestry (DWAF), as it was known at the time, developed model water services by-laws for municipalities. The model by-laws included provisions to empower municipalities to prevent wasteful use of water, impose water restrictions, require large users to submit annual water audits, and specify standards relating to the quality of fittings. The by-laws contained general clauses relating to water efficiency, but left the specifics to the municipality to decide. Several municipalities have water by-laws, based on these model by-laws.

3.2.1. Water restrictions

Water restrictions are currently in place in most of the municipalities in the province, and up-to-date information can be found on the Western Cape Government website[19]. Restriction levels, and their requirements, vary from municipality to municipality, but in general the restrictions have become progressively stringent over the course of the drought. Restrictions generally apply to residential water users, but businesses are increasingly being required to reduce their consumption. Table 3 provides an overview of how water restrictions have progressed in CoCT (adapted from 2017b).

Table 3: Summary of CoCT Water Restrictions

Level	Date	Key restrictions	Target
Level 1	2005	▪ No irrigation 10:00-16:00 ▪ Spray nozzles for hosepipes ▪ No hosing down hard surfaces ▪ No dampening of building sand	10% savings
Level 2	01 Jan 2016	▪ Irrigation for 1 hour on Tue, Wed, Thurs ▪ No irrigation 9:00-16:00	20% savings
Level 3	01 Nov 2016	▪ Car washing with buckets only ▪ Pool covers must be installed	30% savings
Level 3B	01 Feb 2017	▪ No private car washing with municipal water	30% savings
Level 4	01 June 2017	▪ No irrigation with municipal water ▪ No topping up of private pools with municipal water	100 litres/person/day
Level 4B	01 July 2017	▪ No topping up of public pools	87 litres/person/day
Level 5	03 Sept 2017	▪ Residential: Fines if use > 20kl/month (20m³/month) ▪ Commercial: 20% less than same month previous year	87 litres/person/day
Level 6	01 Jan 2018	▪ Residential: Fines if use > 10.5 kl/month (10.5 m³/month) ▪ Non-residential properties: 45% less than in 2015	87 litres/person/day
Level 6B	01 Feb 2018	▪ Residential: Fines if use > 6kl/month (6m³/month) ▪ Non-residential properties: ▪ 45% less than in 2015	50 litres/person/day

19 | www.westerncape.gov.za/general-publication/latest-western-cape-dam-levels

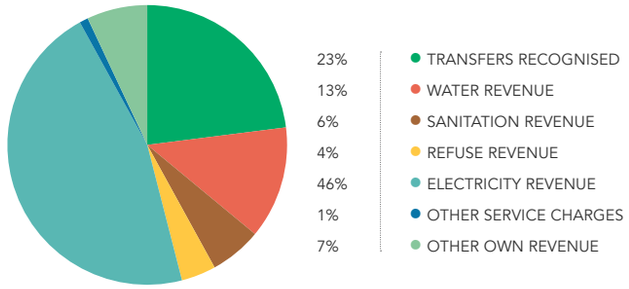

Figure 13: Breakdown of municipal operating revenue in South Africa

3.2.2. Water tariffs

Municipalities either purchase untreated raw water, which is taken directly from dams, springs, rivers and boreholes, or purchase bulk water from bulk water providers (e.g. Water Boards) which is usually treated to a potable standard. The CoCT and other municipalities in the WCWSS purchase raw water from DWS-owned dams and then treat water in municipal-owned facilities. In 2015/16 raw water charges (which include water management and infrastructure charges and a water research fund levy) averaged R1.98/kl nationally (DWS 2017b). The bulk water tariffs averaged R7.44/kl (R7.44/m³), but varied from R4.18/kl to R15.86/kl, depending on various factors including the availability of water, water quality and distance of distribution (DWS 2017b).

Municipalities then distribute potable water to their consumers and charge a retail tariff. Revenue from water sales accounts for around 13% of municipal operating revenue, as shown in Figure 13 (DWS 2017b).

Each municipality is responsible for setting its tariffs and is able to differentiate between users. In general, most municipalities have separate tariffs for residential, commercial and industrial water users, and will provide a free basic allowance of water to indigent households. The CoCT's water and sanitation tariffs are shown in Figure 14 and Figure 15[20]. The domestic tariffs are stepped, whereas commercial and industrial tariffs are a fixed rate.

In general, municipal water tariffs are not cost-reflective (DWS 2017b) and most municipalities are reluctant to significantly raise water tariffs, largely for equity and political reasons. However, the pricing strategy and associated norms and standards are being updated by DWS with the drive to ensure that water is more cost reflective and the water business of a municipality is more sustainable.

Drought situations, where water augmentation is required, present additional tariff-related challenges to municipalities. Water consumption decreases, which can lead to a reduction in revenue. For example, by January 2018 the City of Cape Town had lost around R1.6bn in revenue due to reduced water consumption. In addition, the cost of water increases due to the introduction of new water supply sources. Therefore significant increases in tariffs, rates and/or levies can be expected in 2018.

The CoCT has already increased its water and sanitation tariffs significantly, through its Level 6 tariffs that came into effect on 1 February 2018 (see Figures 14 and 15).

20 | The Level 4 tariffs remained in place until 1 February 2018, even though Level 5 restrictions came into effect on 3 September 2017.

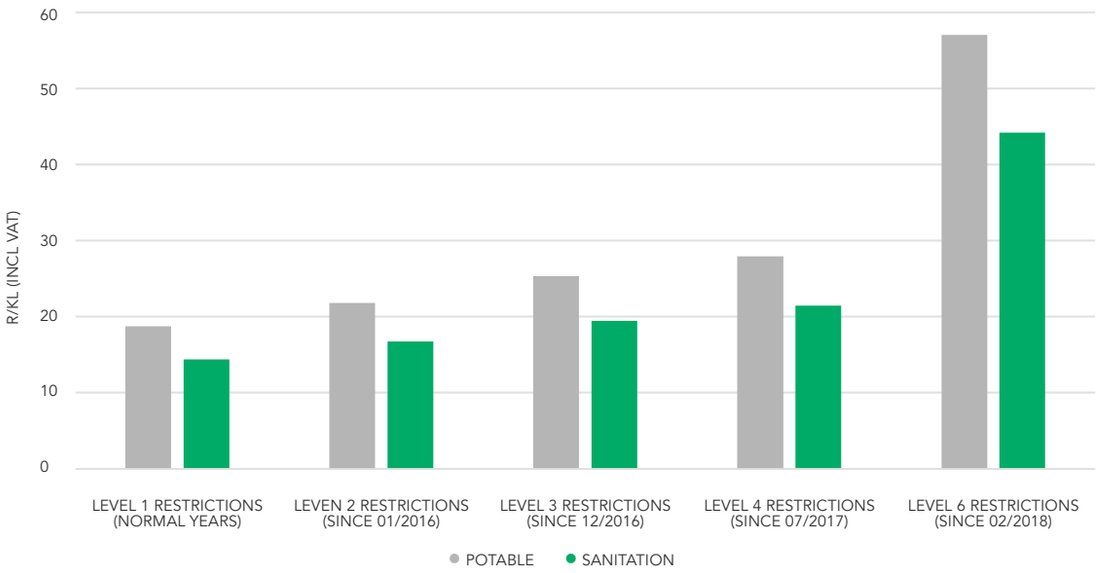

Figure 14: Commercial and industrial water and sanitation tariffs for CoCT

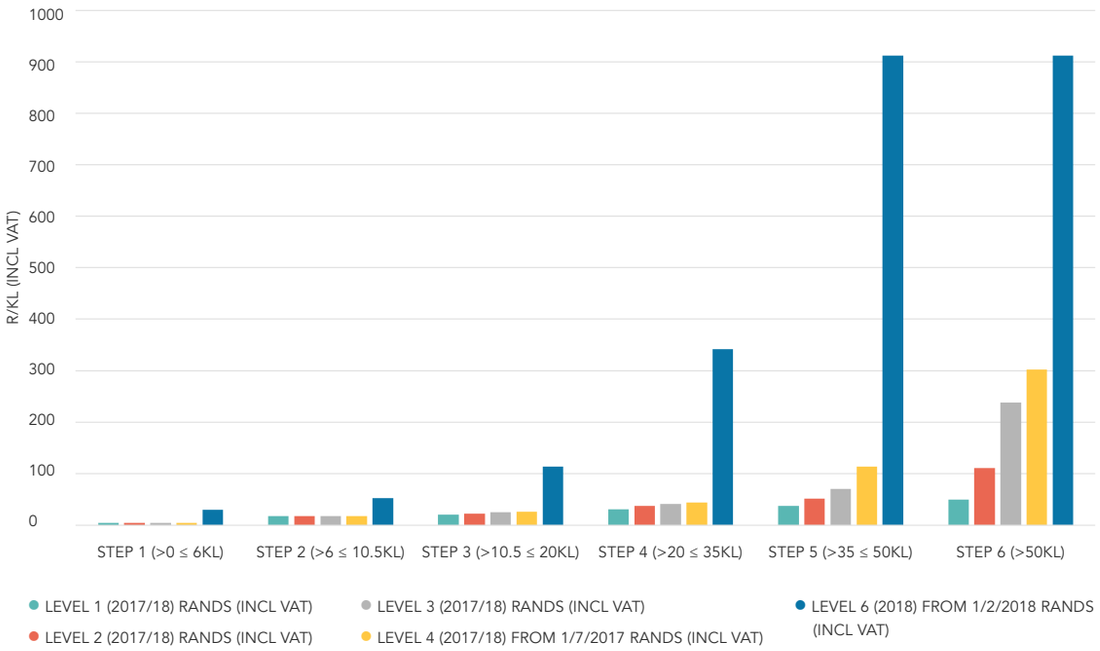

Figure 15: Residential water tariffs for CoCT

3.2.3. Alternative water use

In order to address the absence of national standards for the installation of alternative water systems (such as greywater, rainwater and groundwater systems), the CoCT has developed summary installation guidelines[21] for commercial and residential properties. The guidelines outline the required measures to protect the municipal supply and the water users within the property. They also highlight that approvals are required from the CoCT for drilling a borehole and for all plumbing installations for alternative water systems.

The CoCT's 2010 Water by-law states that no person may use or permit to be used any water obtained from a source other than the water supply system of the City for 'domestic' (defined as cooking, body-washing and drinking) purposes. However, certain entities (including residential developments and businesses) may be permitted to use alternative water sources on-site for these purposes, provided they enter into an agreement with the City to become a Water Services Intermediary (WSI). Further information is available on the City's website.

The CoCT Water by-law is being amended and the proposed revisions include a requirement that all new developments provide for the installation of alternative water systems for certain uses, which include toilet flushing, irrigation and laundries.

While alternative water installation guidelines have not yet been published by other WC municipalities, many do require prospective groundwater users to register, and/or get permission to drill boreholes or install wellpoints.

3.3. Municipal procurement

Municipal procurement is regulated by the Municipal Finance Management Act No. 56 of 2003 (MFMA) and its regulations, including the Municipal Supply Chain Management Regulations (2005). These regulations specify the minimum requirements, but municipalities are allowed to have stricter standards. National Treasury also sets further requirements. The MFMA outlines the competitive procurement processes, and unsolicited bids are not encouraged.

As stipulated by National Treasury (2017), for projects worth more than R30 000 but less than R50 million (incl. VAT), the price contributes 80 points of the total score and the Broad-based Black Economic Empowerment (B-BBEE) status contributes 20 points. For projects above R50 million, the price contributes 90 points and B-BBEE status 10.

Municipalities can also specify prequalification criteria to limit the competition to certain groups. These groups include companies with higher B-BBEE scores, exempted micro enterprises (EME[22]) and qualifying small business enterprises (QSE)[23].

21 | http://cct.gov.za/bC2nV

3.3.1. City of Cape Town procurement

Companies wishing to do business with CoCT must first register with the City's supplier database and the national Central Supplier Database (CSD).

For goods and services less than R200 000, CoCT publishes Requests for Quotations (RFQs) on its procurement portal[24]. Companies must first register as a supplier and then register on the portal.

For goods and services exceeding R200 000 (VAT included), a formal bidding (tender) process is required. Companies must be registered as a supplier and registered on the tender portal[25], where tenders are advertised. Tenders are also advertised in local newspapers. For tenders valued at more than R10 million there is a more extensive process, including additional documentation requirements.

For more information on the procurement processes, please visit the CoCT website[26]. The list of tenders received by the City, and their prices, can be viewed here[27].

3.3.2. Procurement in emergency situations

Section 55(2) of the Disaster Management Act (2002) states that 'if a local state of disaster has been declared…the municipal council concerned may…make by-laws or issue directions, or authorise the issue of directions, concerning…emergency procurement procedures'. These powers may be exercised only to the extent that it is necessary for the purpose of assisting and protecting the public, providing relief to the public, protecting property, preventing or combating disruption or dealing with the destructive and other effects of the disaster.

In October 2017 and in terms of the Disaster Management Act, the CoCT Council delegated its authority to the city manager, who is now able to issue directions without following the Council's usual statutory procedures or permission requirements.

New Technology Committee

The Western Cape Government has partnered with the CoCT's New Technology Committee. This committee meets regularly to review and understand new technologies in the market. It gives companies the opportunity to present their products and services to government in a fair manner. For information on how to submit information to the committee, please contact openinnovation@capetown.gov.za

22 | Enterprises with an annual turnover of less than R10 million, or recently formed or incorporated entities that have been in operation for less than one year.
23 | A business with an annual turnover of more than R10 million but less than R50 million.
24 | web1.capetown.gov.za/web1/procurementportal
25 | web1.capetown.gov.za/web1/TenderPortal
26 | goo.gl/zAjjhj
27 | www.capetown.gov.za/Work%20and%20business/Doing-business-with-the-city/Tenders-RFQs-and-supply/Tenders-received

4 – Opportunities and barriers

There are opportunities for technology and service providers in water metering and monitoring, water efficiency, reuse and alternative (non-surface) water supply in the Western Cape. Water scarcity is currently a key driver for investment in the urban water sector in the Western Cape.

Where applicable in this section, the technologies are discussed according to their end-user markets, i.e. the industrial, commercial, residential and municipal sectors. Figure 16 provides an overview of the opportunity areas in the context of this chapter.

In the industrial and commercial markets, businesses are re-prioritising their budgets and directing spending towards technologies in these opportunity areas. For example, several companies that had planned to invest in solar photovoltaics have now de-prioritised these projects in favour of those that reduce their reliance on municipal water supply (GreenCape analysis). AAccording to a survey of the members of the Cape Chamber of Commerce and Industry (CCCI) in October 2017, 65% of the respondents had made changes or investments in their business to ensure they will use less water, and 45% have developed long-term plans to make their business less dependent on municipal water supplies (CCCI 2017).

Level 6 water restrictions in Cape Town require that all non-residential users reduce their consumption by 45% compared to 2015 usage, creating appreciable opportunities for the entire water value chain

Market	Section 4.1	Section 4.2	Section 4.3
Industrial	Section 4.1.1. • Smart water metering • Water quality monitoring	Section 4.2.1 • Industrial effluent treatment • Upgrading treated effluent • Water exchange networks	Section 4.3.1 • Groundwater supply • Rainwater harvesting
Commercial		Section 4.2.2 • Greywater reuse • Water efficient devices	
Residential			
Municipal	Section 4.1.2 • Non-revenue water	Section 4.2.3 • Potable water reuse	Section 4.3.2 • Groundwater • Seawater desalination

Figure 16: Overview of the key opportunity areas outlined in this report

4.1. Water metering and monitoring

The opportunities, drivers and barriers relating to water metering and monitoring are discussed in this section. In 2016/17 the CoCT budgeted almost R200 million for meter replacement and new water meter connections, and similar amounts are expected for the 2017/18 and 2018/19 financial years (CoCT 2016). While many of these meters will not be smart meters, it gives an indication of the budget allocation and market potential for municipal-scale metering.

4.1.1. Industrial, commercial and residential markets: water metering and monitoring

Opportunities

Smart water meters: There are opportunities in all urban private sector markets for smart meters. The water meter industry has seen substantial development in the last two decades, with many new 'smart' capabilities added to water meters. Many are now able to communicate with the municipality or user, monitor consumption patterns, dispense prepaid water, provide leakage alerts and restrict flows remotely (WRC 2011 and 2015).

The current market lies predominantly in sub-metering (billing) for large residential estates, and multi-tenanted/sectional title buildings, as well as the commercial sector. However, the demand for these systems is increasing across the private sector as a tool for improved water management in the context of the drought. Several local smart metering companies have noted a significant increase in sales since around the middle of 2017, coinciding with lower dam levels, higher tariffs and more stringent water restrictions.

Water quality monitoring: There are opportunities for businesses to offer fast and efficient water quality testing services. With the increasing adoption of decentralised alternative water systems (such as groundwater and rainwater harvesting), the demand for water quality monitoring has grown significantly. In Cape Town, analytical laboratories are struggling to meet demand, and there are reports of samples being turned away. In addition, water quality tests are expensive. Many laboratories offer water quality assessment for between R1 500 and R2 000, with a complete SANS241 drinking water quality analysis costing up to ~R10 000.

Drivers

- **Water scarcity:** Water shortages and intermittent supply are significant risks for many businesses. Businesses are increasingly valuing the importance of water metering and monitoring as a tool to manage their water use.
- **Regulation:** Water restrictions and fines (see Section 3.2.1) have been stimulating the market for smart meters in the private sector, as businesses are increasingly under pressure to better manage their water consumption. In addition, as of 12 January 2018, all groundwater users are required to meter their groundwater abstractions and report readings to DWS on a weekly basis.
- **Leak detection:** Unlike traditional meters, smart metering enables real-time monitoring and analysis, which can be used to detect leaks. This function is increasingly being viewed as a useful tool for businesses to realise quick and cost-effective water savings.
- **Billing inaccuracies:** Businesses are installing their own 'check' meters to verify municipal water meter readings.
- **Water audits:** Several municipalities require large water users to submit audits of their water usage on an annual basis. The threshold varies between municipalities but, in the case of the CoCT, those using more than 10 000 kilolitres a year are required to submit water audits, as per the City of Cape Town Water By-law (2010). The City is increasingly enforcing this provision, which compels businesses to better understand their water consumption.

Barriers

- **Awareness:** In general, there is a lack of customer knowledge of smart meters, as well as a lack of appreciation of their benefits. This is partly due to historically underpriced water and low sanitation tariffs. However, this will likely change as water tariffs increase.
- **Capital costs** of smart meters and the associated metering infrastructure can be a barrier, particularly for the residential market, representing an opportunity for innovative private sector financing.

4.1.2. Municipal market: water metering and monitoring

Non-revenue water (NRW) is the volume of water used by a municipality for which no income is received due to various factors, including water losses, meter under-registration, billing errors, theft and unbilled authorised consumption. As shown in Table 4 below, South African municipalities cumulatively use around 4 000 million m³/year, of which 41% is NRW (DWS 2017a), representing an estimated R6.3 billion in lost revenue each year (DWS & SWPN 2015a). In the Western Cape, NRW is around 21% (DWS 2017a). Figure 17 (DWS 2017b) shows the non-revenue water levels at a municipal level.

Non-revenue water results in losses of ~R6.3 billion each year for South African municipalities, representing significant opportunities for consultants, planners, and manufacturers of water loss reduction systems

Table 4: Overview of non-revenue water in South Africa[28]

Province	Population	SIV (m³/annum)	NRW (m³/annum)	% NRW	% WL	l/c/d	ILI
EC	4 477 918	332 151 376	158 647 165	47.80%	45.00%	200	4.8
FS	2 723 028	207 835 805	106 908 574	51.40%	46.60%	209	4.8
GT	12 978 281	1 473 100 700	528 839 540	35.90%	27.40%	305	5.8
LIM	4 225 967	281 235 907	155 016 679	55.10%	55.10%	182	5
KZN	8 491 508	697 751 184	327 444 107	46.90%	43.00%	225	6.2
NW	3 039 995	206 496 825	105 577 898	51.10%	51.10%	186	4.7
NC	1 085 944	94 205 305	45 418 308	48.20%	45.50%	238	7.1
WC	6 108 993	482 695 411	102 720 237	21.30%	16.70%	201	2.4
MP	3 622 506	270 990 713	129 852 490	47.90%	43.90%	205	4.3
National	46 754 140	4 046 463 225	1 659 588 711	41.00%	35.90%	233	5.3

28 | SIV: System input volume; WL: Water losses, which include real losses (e.g. leakages and overflows) and apparent losses (customer meter inaccuracies and unauthorised consumption); l/c/d: litres per capita per day; ILI: Infrastructure Leakage Index

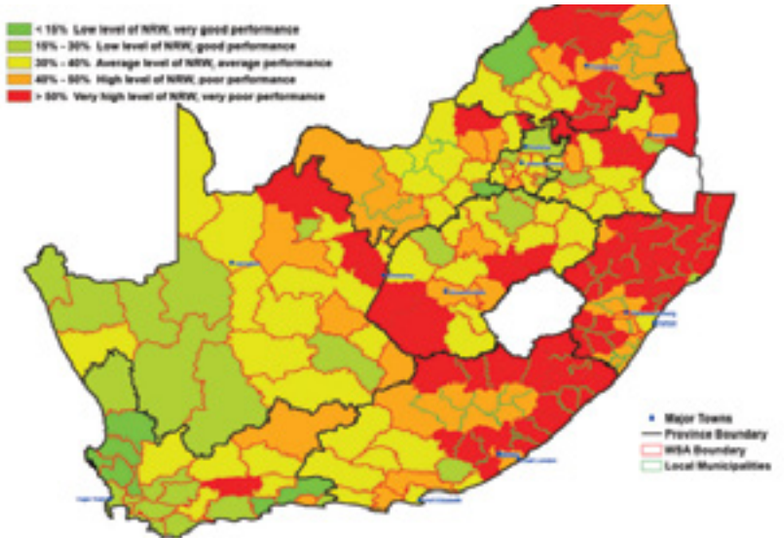

Figure 17: Municipal non-revenue water at the 2012 baseline

Through implementing Water Conservation and Water Demand Management (WCWDM) projects to reduce NRW, savings of R2-3 billion are possible each year for the country as a whole (DWS & SWPN 2015a). These savings are linked to various benefits, including increased revenue, deferred capital expenditure and lower municipal costs. The market lies predominantly in the metros and the large cities, which represent 84% of this national savings potential (DWS & SWPN 2015a).

Opportunities

- **WCWDM projects** present a number of opportunities for designers, consultants and planners of water loss reduction systems, as well as companies that manufacture, assemble and install components that help utilities understand and manage water losses. Opportunities range from metering and billing systems, bulk meter calibration and assessment, pressure management and optimisation as well as leak detection, monitoring and repair.
- **Awareness raising:** Many WCWDM projects have been proven to provide very good returns on investment, with payback periods of less than three years (DWS & SWPN 2015b). However, municipalities are often unaware of these financial benefits. Supporting municipalities to address NRW is an opportunity for the private sector, but this requires awareness raising on the benefits of addressing NRW.
- **Financing:** There are also opportunities for financial institutions as South African metros cumulatively require ~R2 billion a year to fund their WCWDM programmes, and currently have a shortfall of ~R500 million (DWS & SWPN 2015b).

Drivers

There are four major triggers for initiating a NRW reduction programme within a municipality:

- **water resource constraints** (no or not enough water)
- **regulatory compliance** (DWS)
- **auditory compliance** (Auditor-General's findings on water losses)
- **revenue enhancement** (where savings result in more income for the municipality).

Barriers

While there are considerable opportunities for the private sector in NRW, there are also significant barriers to entry into the municipal market, as outlined in detail in 'General barriers to the municipal market' discussed in Section 4.2.3. In addition, there is a general lack of political will to prioritise non-revenue water projects, as well as limited compliance and enforcement capabilities among authorities tasked to reduce NRW.

South Africa's 200+ state-owned local industrial parks, and Cape Town's 2 300+ known manufacturing sites present a sizeable market for the development of water exchange networks.

4.2. Water efficiency and reuse

There are a number of opportunities across all urban markets relating to technologies that reduce water consumption, either through improving the efficiency of water use, or by enabling the reuse of water.

Various types of water can be reused, including greywater (wastewater from hand basins, showers, baths and laundries), sewage water or industrial effluent. Depending on the intended use, the wastewater may require treatment prior to reuse, and may either be treated to potable or non-potable standards. As shown in Figure 18, water reuse can occur at a variety of scales, including onsite reuse (where the water is reused at the same site where it was first used), indirect reuse (where treated wastewater is returned to local water resources and is later abstracted and reused by downstream water users) or direct reuse (where treated water is delivered directly to water users).

4.2.1. Industrial market: water efficiency and reuse

The total Gross Value Add (GVA) for moderate and highly water intense users in the WC in 2016, excluding agriculture, was R155 billion, which is approximately 30% of the total provincial GVA of R528 billion (Quantec 2017). All these industries are under stress to reduce their water consumption.

The industrial sector presents opportunities for both technology and services providers, many of which are already tapping into this market with a wide range of innovative and readily available products for water reuse.

Opportunities

Industrial effluent treatment systems: Industrial companies are increasingly investigating the reuse of their effluent (wastewater) streams. Internationally, there is a general move towards zero liquid discharge, and several industries in South Africa already reclaim and reuse significant amounts of wastewater, such as the mining and sugar sectors. In most cases, the effluent requires treatment before it can be reused. There are opportunities for wastewater treatment companies to design, supply, install and maintain these systems.

Upgrading treated effluent: Treated effluent, which is treated wastewater from municipal wastewater treatment works, is becoming increasingly popular as a source of reused water in industrial companies. Treated effluent generally needs to be upgraded to process quality standards before it can be used on-site for most industrial applications. This creates a further opportunity for water treatment companies in the industrial market in the WC. In Saldanha Bay, treated effluent is an attractive water source for the large industrial users, who have already invested heavily in water efficiency reuse measures. The market for advanced treatment of initially treated effluent in the municipality is estimated to be 3-5 MLD, based on projects being investigated by the large industrial water users. These projects are, however, being procured rapidly, due to the current water constraints.

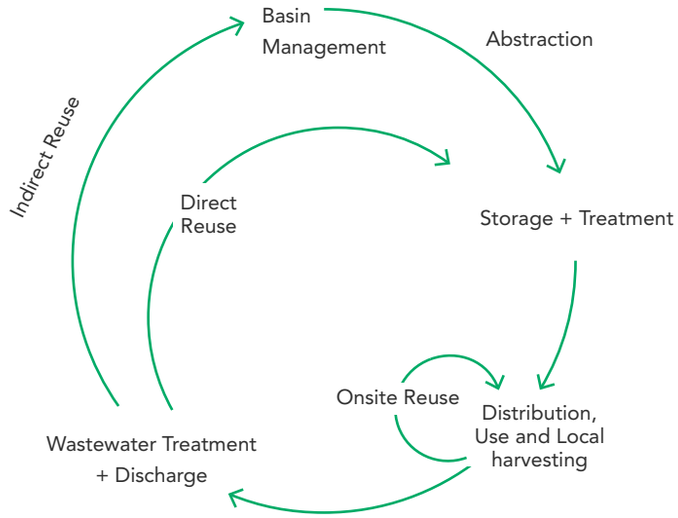

Figure 18: Water reuse opportunities across the water value chain

Water exchange networks: Within industrial parks, there is an opportunity to develop water exchange networks where water can be cascaded between users and treated in distributed or centralised facilities for reuse. Certain industries where water comes into contact with the product, such as the food and beverage sector, are often reluctant to reuse water due to public perception and health risks. However, their wastewater could be reused by other companies through a water exchange network. In addition, businesses could benefit from economies of scale of shared or centralised treatment, which tend to kick in around 2.5 MLD (most industrial water users in the Western Cape consume less than 0.5 MLD).

While several industrial companies have expressed interest in such developments, coordinating the multiple parties involved and understanding the regulatory requirements remain a challenge.

The opportunity lies in creating valued partnerships between industries where water use synergies exist. In South Africa, there are more than 200 state-owned local industrial parks, and in Cape Town there are more than 2 300 known manufacturing sites (Adams 2017) representing a sizeable market.

Drivers

- **Supply risks:** The main driver for the implementation of water reuse systems in the industrial sector is the risk of insufficient water supply, due to increasing water scarcity as a result of the drought. Water supply augmentation has recently become a high priority for most industrial companies, which has prompted them to consider various options they would not have explored previously. Due to the relatively low water tariffs, the business case for industrial reuse can sometimes be poor (especially in the case of less-intensive industrial water users). However, the business case significantly improves when supply risks are taken into account. In addition, tariff increases, such as the CoCTs water and sanitation tariffs that came into effect on 1 February 2018, also improve the business case.
- **Municipal water quality discharge regulations** require that industrial effluent meets certain quality standards before it can be discharged to municipal wastewater systems. Failing to do so can lead to significant fines and penalties. Consequently, companies are often obliged to invest in water treatment, which enhances the business case for reuse.

Other drivers include:

- **Corporate social responsibility** commitments by large industrial businesses (particularly those with international parent companies) often require them to report on their water consumption against set targets, and submit their plans for investment in water efficient technologies.

- **The improved reliability** and successful operation of wastewater treatment plants have created a low-risk perception for companies considering these technologies. Additionally, technology providers are now offering to take up the responsibility to restore the implemented technology should it malfunction, which further reduces the risk of implementation.

- **Water restrictions:** Level 6 water restrictions in Cape Town require that all non-residential users reduce their consumption by 45% compared to 2015, which is pushing businesses to consider reuse opportunities.

Barriers

- **High capital costs** are one of the main barriers to the adoption of wastewater treatment technologies in the industrial sector, and financial incentives are fairly limited across the province.

- The capital costs of reuse projects vary significantly, depending on a number of factors, including the quality of the wastewater and the required level of treatment. Treating organic wastewater to potable standards requires significant capital investments and can cost in the order of R20-R120 million per project, with typical project sizes ranging from 0.2 – 1 million litres per day (MLD) produced. A system treating inorganic effluent to potable standards can cost in the order of R10-15 million per MLD produced.

- **Brine disposal:** Depending on the level and type of treatment, a saline brine waste stream may remain after the recovery of water. This presents a challenge for many companies, as most municipalities do not permit the direct discharge of brine into sewerage lines. Companies may then need to incur additional costs to further concentrate the waste stream (e.g. using eutectic freeze technology or evaporative processes).

- **Land availability:** Some industrial companies do not have the space to accommodate water reuse infrastructure.

- **Public perception:** While reuse is becoming increasingly accepted, some industrial companies are wary of the risk of negative public perception relating to the reuse of effluent.

- **Awareness:** A lack of knowledge or awareness of water reuse technologies is common among smaller industrial companies, and acts as a barrier to adopting these technologies.

4.2.2. Commercial and residential markets: water efficiency and reuse

In most urban areas in the Western Cape, the residential sector is the largest water user group, such as the CoCT, where domestic use accounts for around 70% of the City's water demand (see Figure 19 — CoCT 2017a). However, in the case of Saldanha Bay municipality, industrial and commercial water users are the largest user (around 60%). The residential market for water efficient devices and reuse systems lies predominantly in the middle- to high-income households. There are just under 17 million households in South Africa (1.8 million in the Western Cape), of which around 42% pay for their water (StatsSA 2017a). Assuming around 5% of these households are property owners and are able to invest in water efficiency and reuse systems, the potential residential market in the province is around 90 000 households. This market is growing as shown in Table 5. Between January 2017 and August 2017 residential buildings valued at R6.8 billion were completed, and building plans valued at R10.7 billion were passed by the larger municipalities in the province (StatsSA 2017b).

In the commercial market, office space in Cape Town totals ~2 500 000 m^2 (JLL 2017) and water use by the commercial sector accounts for around 13% of the City's demand, as shown in Figure 19. The commercial market in the WC is growing as illustrated in Table 5. Between January 2017 and August 2017 ~160 000 m^2 of office, banking and shopping space was completed (valued at R1.2 billion), and ~170 000 m^2 of building plans were passed (valued at R1.4 billion) by the larger municipalities (StatsSA 2017b).

New residential and commercial property developments are a key market for water efficient devices and reuse systems, which are increasingly being specified in the design stage. Assuming 5% of the budget for new residential and commercial developments is for water and sanitation infrastructure, this translates to a potential market of ~R900 million per year in the Western Cape[29].

Opportunities

Reuse systems: Greywater from commercial and residential properties can be reused on-site, either outdoors (e.g. for garden irrigation) or indoors if treated (e.g. for toilet flushing). Current technologies for outdoor use range from simple low-tech adaptors to automated irrigation systems incorporating basic treatment.

There has been a significant increase in demand for greywater reuse systems, particularly for new developments and commercial businesses, where there are opportunities to design, manufacture, install and maintain cost-effective greywater systems. The residential (retrofit) market is less attractive for investment, as some installers are reporting that this market is starting to plateau due to households collecting greywater for toilet flushing (typically using buckets), rather than installing irrigation systems under the current water restrictions.

Water efficient devices: There are opportunities for designers, manufacturers, retailers and installers of water-efficient devices. There is considerable scope to increase the uptake of products currently on the market, including efficient showerheads and tap aerators, and waterless urinal systems. New innovative products are rapidly entering the market. There is scope for further innovation, particularly for products and smart technologies that target the major water uses in commercial and residential buildings, shown in Figure 20 (Jacobs et. al. 2006) and Figure 21 (EPA 2012) as well as outdoor use (including pools and gardens).

Over the course of the drought, businesses and residents in the WC have become increasingly aware of water efficient technologies and devices. However, there are further opportunities for retailers and plumbers to promote these products to customers to increase their visibility and accessibility.

Table 5: Commercial and residential property market growth in the Western Cape (Jan-Aug 2017)

Opportunity	Type	Value
Commercial	Office, banking and shopping space completed	R1.2 bn (~160 000 m^2)
	Building plans passed	R1.4 bn (~170 000 m^2)
Residential	Residential buildings completed	R6.8 bn
	Building plans passed	R10.7 bn

New residential and commercial property developments in the Western Cape present an annual market of ~R900m for water efficient devices and reuse systems

19 | Assuming total annual value of residential developments is R10.7 bn/8*12 = R16 bn and total annual value of commercial developments is R1.4 bn/8*12 =R2 bn.

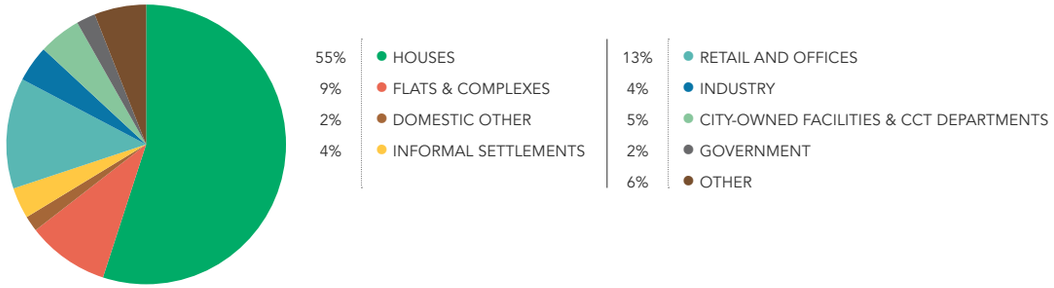

Figure 19: Breakdown of CoCT municipal potable water consumption by use category (1/07/16 – 30/06/17)

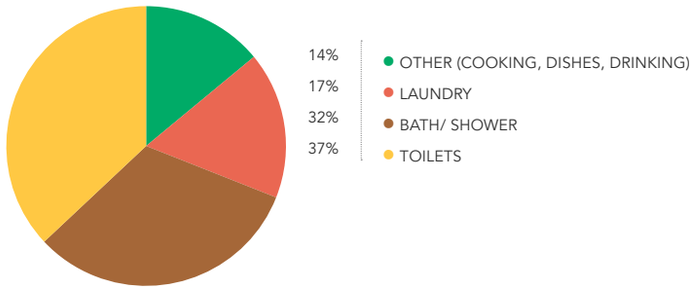

Figure 20: Typical pre-restriction indoor water use in mid- to high-income households

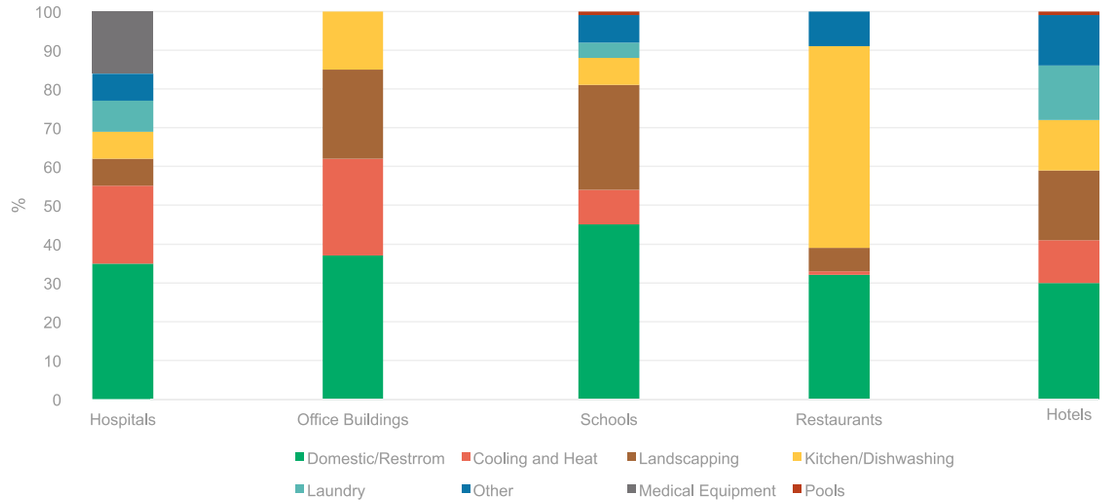

Figure 21: Typical end uses of water in various types of commercial and institutional facilities

Market response perspectives from Gumtree South Africa (Masuabi 2017), an online classifieds website:

According to Gumtree there has been an 'explosion' in demand for water-related products and services, including plumbers and borehole service providers – which in Cape Town has doubled in a year.

In the Western Cape, more than 50 specialist suppliers of water-recycling systems are now listed; there are over 1 300 listings for pool covers (which is traditionally a small category) and over 1 400 listings for water tanks.

The demand for and supply of water-efficient landscaping products (e.g. artificial grass, water-wise plants, paving and decking) has also significantly increased on the website.

Drivers

Water supply risks: For businesses, the risk of insufficient water supply can lead to cut-backs, closures, financial losses and retrenchments. The recent drought with its impact on water availability has significantly increased this risk. According to a survey conducted on members of the Cape Chamber of Commerce and Industry, 51% see the water crisis as a threat to their business, and 23% indicated that the water crisis has caused them to halt or postpone new investments in their business (CCCI 2017)[30]. Due to the relatively low water tariffs, the business case for reuse systems on existing buildings has been poor (particularly for indoor-use systems where treatment is required). However, the business case significantly improves when supply risks are taken into account. In addition, tariff increases, such as the CoCT's Level 6 water and sanitation tariffs that came into effect on 1 February 2018 (see Figures 14 and 15), also improve the business case.

Water restrictions: Water restrictions in the residential sector, including restrictions on the use of potable water for garden irrigation, are increasing the uptake of residential reuse systems. As shown in Table 3, water restrictions have become progressively stringent over the course of the drought in the Western Cape. In September 2017, the CoCT implemented Level

30 | Both industrial and commercial members of the Cape Chamber of Commerce and Industry were surveyed.

5 water restrictions, which included a requirement for commercial businesses to reduce their water consumption by 20%. Heavy fines and capped usage for high-consuming users were also introduced. In January 2018, restrictions were increased to Level 6, which require businesses to reduce their water consumption by 45%. As water restrictions are likely to remain in place (to some extent) for the foreseeable future, they are expected to continue to drive the market in the long term.

Social responsibility commitments are increasing the uptake of water efficiency and reuse technologies, especially in the case of multi-national companies.

Water and sanitation tariffs are still too low to contribute to market growth. As noted, most municipalities are reluctant to significantly raise water tariffs, even to levels that are cost-reflective (DWS 2017b). However, as outlined in Section 3.2.2, tariff and/or rates increases can be expected, and the national pricing strategy is currently being reviewed. The CoCT has already increased its tariffs significantly, through its Level 6 tariffs that came into effect on 1 February 2018.

Regulatory requirements: The CoCT is in the process of revising its by-laws and guidelines to more actively promote the uptake of water-efficient, reuse and alternative water technologies, particularly for new developments. For example, the proposed Water by-law amendments include the requirement that all new developments provide for the installation of alternative water systems for certain uses, which include toilet flushing, irrigation and laundries. A similar trend is expected in other municipalities. While the process of revising by-laws can be lengthy, once implemented it will have a positive effect on the market for, and awareness of, these technologies.

Barriers

- **Public perceptions** can prevent market growth, particularly in the case of greywater reuse and waterless sanitation technologies.
- **Property leasing:** Tenants often expect the landlord to take responsibility for water efficiency measures, and vice versa. Moreover, it can be difficult for the landlord or the lessee to recoup the full long-term returns on an investment in these technologies.
- **Skills shortage:** There is currently a shortage of qualified plumbers experienced in installing greywater systems.
- **Capital costs:** With the exception of the low-tech manual systems, the capital cost of greywater systems is still relatively high. Automated residential irrigation systems (without treatment) cost up to R25 000, and indoor reuse systems more.

4.2.3. Municipal market: water efficiency and reuse

Opportunities

Potable water reuse: In South Africa, approximately 2 100 million m^3 of treated effluent is discharged from municipal wastewater treatment works (WWTW) to river systems every year (WRC 2006). Municipalities are increasingly interested in treating this effluent to potable standards for either direct potable reuse (DPR) or indirect potable reuse (IPR) (see Figure 18).

- The CoCT is potentially looking to augment its supplies with around 75 million litres/day (75 MLD or 75 000 m^3/day) of wastewater treated to potable standards as part of its proposed augmentation plans (see Table 2), representing a potential market of around R2 billion[31] in Cape Town alone.
- As these projects require a high level of technical expertise and resources that are often not available in the public sector, there are significant opportunities for private sector involvement, including the design, building, construction, operation and maintenance of municipal-scale reuse projects.

The most accessible market for municipal-scale potable reuse lies in coastal communities and cities, due to the relative ease of brine discharge (to sea), as well as the lack of downstream water-users reliant on the return flows. However, there are opportunities for inland systems, especially since desalinated seawater is not an available source of water inland.

Table 5 in Section 4.3.2 shows the typical costs for potable water reuse (GreenCape analysis[32]), which are generally 30-50% cheaper than seawater desalination.

Drivers

- **Water scarcity:** Increased water scarcity is forcing municipalities to implement reuse and water efficiency programmes. As shown in Figure 22 (Coetzee 2017), globally most potable reuse schemes have been developed within the last 20 years, and it is expected that potable reuse will increase as populations grow and water scarcity increases (WHO 2017).

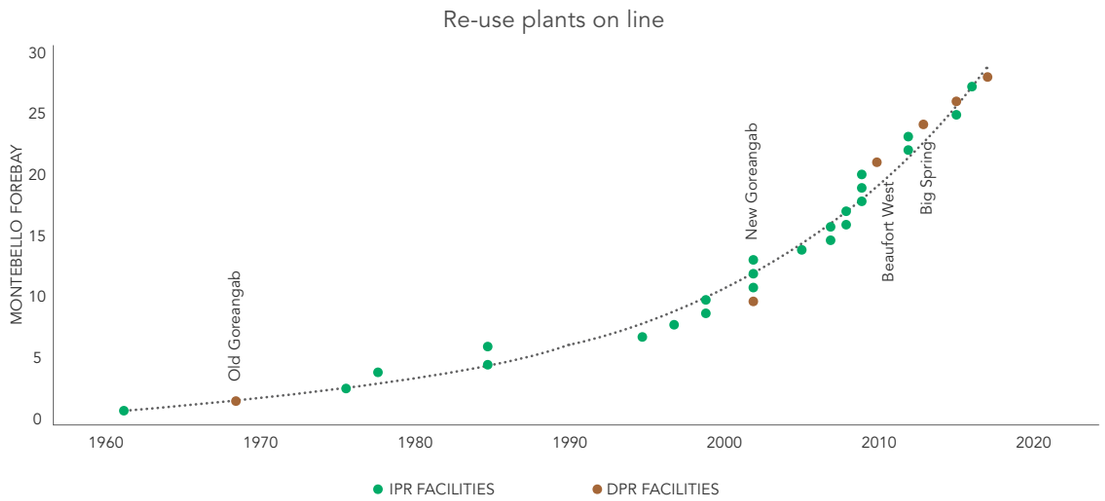

Figure 22: Global increase in potable reuse plants

31 Assuming direct potable reuse at a cost of R25-30 million per MLD, which assumes the wastewater treatment plant from where the water is supplied is operating satisfactorily and does not require upgrades. It also assumes that permeation from a membrane bioreactor will be supplied to the potable water reclamation plant, which will include: ozone advanced oxidation process (AOP), biological activated carbon, ultrafiltration, brackish water reverse osmosis, UV AOP and stabilisation (Koen 2017).

32 The analysis draws from a range of sources, including project developers and consultants, tender submissions and personal communications with global desalination consultant, Nikolay Voutchkov from Water Globe Consultants.

General barriers to the municipal market

While there are considerable opportunities for private sector investment in municipal-scale projects, there are also significant barriers:

Access to funding: Municipal-scale projects are often capital-intensive, and access to funding can be a major constraint, particularly for the smaller, less financially stable municipalities that do not have the capacity (or that are considered too high risk) to develop bankable project pipelines and raise funds off-budget. This can lead to shortfalls in funding available for water services infrastructure. Table 1 in Section 2 of this MIR highlights these shortfalls in South Africa.

Municipal creditworthiness: Where water service companies are looking to finance projects and enter into performance-based contracts or water off-take agreements (e.g. build-own-transfer or similar models, where the municipality purchases treated water on a volumetric basis), the credit-worthiness of the municipalities can be a barrier.

Capacity constraints: Nationally, the ratio of civil engineering staff per 100 000 people is less than half of what is required to adequately plan, deliver, operate and maintain services, including water services (Lawless 2017). These capacity constraints limit the ability of municipalities to confidently implement more advanced water projects, including potable water reuse.

Municipal procurement processes (as outlined in Section 3.3) can be lengthy, and tenders are often poorly specified. In addition, Public Private Partnerships (PPP) (which are relatively uncommon in the South African water sector) can be complex and difficult to arrange[33]. As an example, it took Overstrand Municipality over four years to outsource the operations and maintenance (O&M) of its water and wastewater treatment works (Blignaut & Strangfeld 2017).

Barriers to potable water reuse

Public perceptions of the reuse of wastewater, acceptability on religious grounds, and the public mistrust in water utilities, are key barriers to potable water reuse, especially direct reuse (Millson 2016).

Health risks: Although there have been significant advances in water treatment technologies, health risks related to direct potable reuse from treated effluent remain a concern. Adequate safeguards, complex treatment technologies, a high-level of technical expertise and sophisticated operational and management systems, are critical requirements to minimise this risk (DWA 2011; WHO 2017). The consequences of poor design or failure of control measures are substantial, and will negatively impact on the future market.

Brine disposal: In general, reverse osmosis, which results in a highly saline brine waste stream, is a preferred barrier technology for direct potable water reuse. At the coast, brine is usually disposed of in the sea. However, disposal is more complicated and costly at inland sites. It is possible to treat water to a potable standard without reverse osmosis, such as at the Goreangab Water Reclamation Plant in Windhoek, Namibia. However, salinity can build up in the system over time, as has been observed in the Windhoek plant. Increasingly brine is being considered a resource with further extractable value, but it remains a large environmental barrier to potable reuse projects.

Downstream users: Wastewater discharges to river systems are often relied upon by downstream users who essentially reuse the water (return flows, which account for 13% of water availability in South Africa). Diverting this water for upstream reuse could therefore reduce downstream water availability.

Regulations: Reuse projects are typically subject to a number of regulatory authorisations and controls in several different acts, and the regulatory approaches may differ between these acts. As a result, reuse projects are difficult to implement quickly or cost-effectively, making other alternatives more favourable (DWA 2011).

33 | For more information on PPPs, GTAC, which is an agency of National Treasury, provides a number of valuable resources, including guidelines and manuals for establishing PPPs. Visit: www.gtac.gov.za/Pages/mmg.aspx

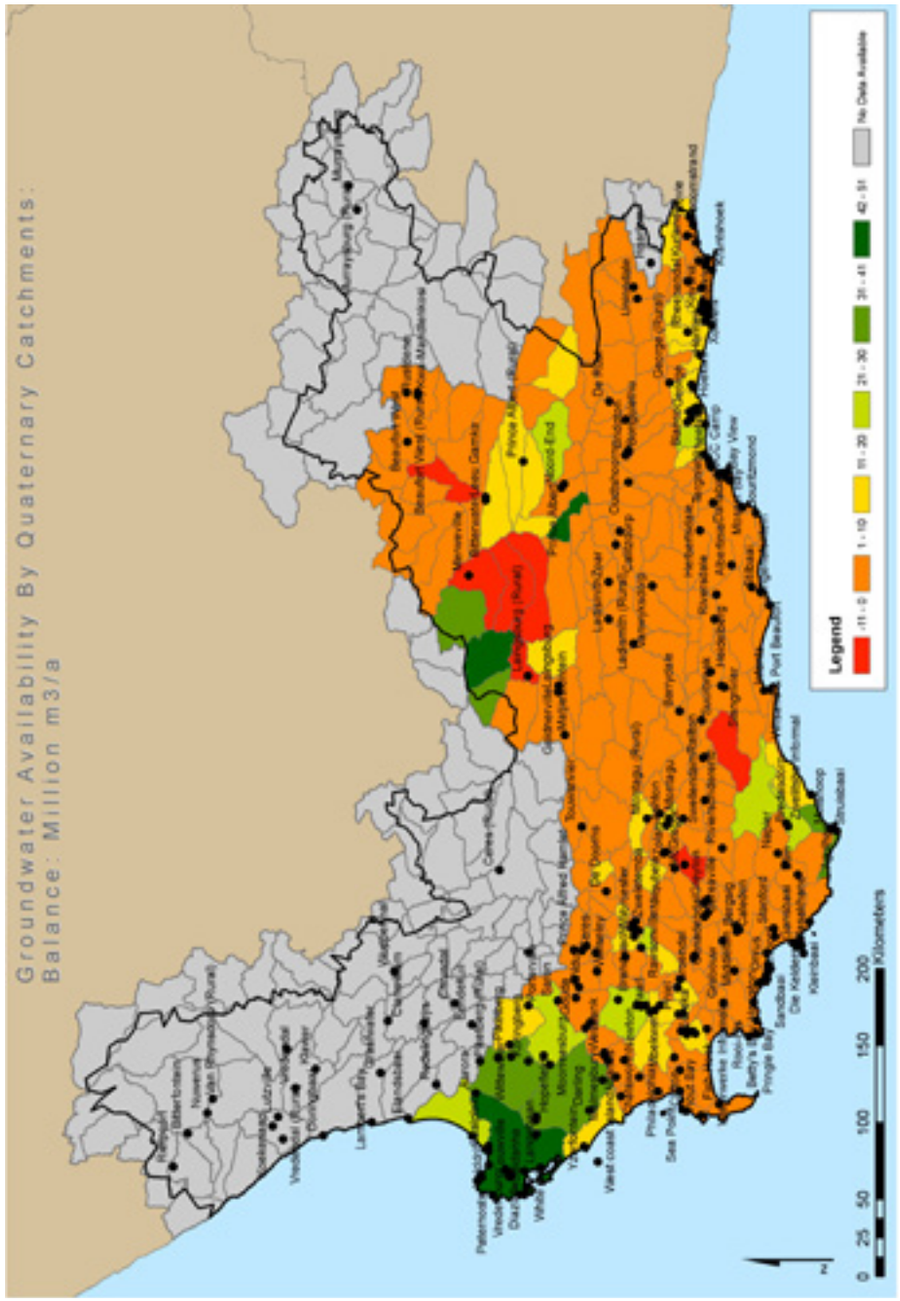

Figure 23: Groundwater availability in the Western Cape

4.3. Alternative water supply

Alternative or non-traditional water sources, refer to 'new' water sources other than surface water. These include groundwater, desalinated sea water, rainwater (runoff collected onsite from roofs and hardened surfaces) and storm water (runoff collected on a neighbourhood or multi-erf scale).

This section focuses on the potential market with the most immediate opportunities, and excludes longer-term opportunities such as storm water harvesting, sustainable urban drainage systems (SUDS) and managed aquifer recharge (MAR), which are all interlinked.

4.3.1. Industrial, commercial and residential markets: alternative water supply

There has been significant growth in the demand for on-site alternative water supply from the private sector and, in many cases, this is one of the first drought-response measures implemented. A local greywater and rainwater system installation company has reported a 100-fold increase in interest in its services during the 2017 winter period, compared to the previous winter, and the company is booked up five months in advance for its rainwater systems. Another similar company reported a four-fold increase in revenue since 2015.

The residential market for alternative water systems could potentially be around R5.8 billion in the Western Cape[34]. Property developers are also increasingly interested in their own water supply schemes, and several developers intend to go "off-grid" through necessity. Most municipalities also require that new developments incorporate rainwater harvesting systems.

Opportunities

Groundwater: There is still substantial potential for groundwater development in South Africa. Nationally, the total estimated yield of available, renewable groundwater is between 7 and 10 billion m^3/year, while between 2 and 4 billion m^3/year is currently being used (DWS 2017b). Figure 23 shows the groundwater availability in the Western Cape (DWS 2017c, DWS 2017d).

- Groundwater is also relatively quick to access (especially under Schedule 1 or General Authorisations – see Section 3.1.1) and cost effective relative to other alternative water sources (see Table 5); thus the market for groundwater services is substantial.

- Companies that offer groundwater-related services and systems have experienced a significant increase in demand from the private sector. There is considerable scope for this demand to grow in the short term and in the long term through sustainable groundwater management. Groundwater systems may include boreholes or wellpoints, distribution and treatment systems. Groundwater-related services include geohydrological studies, borehole drilling, yield testing, and the operation and maintenance of groundwater systems.

Rainwater harvesting: The Western Cape is predominantly a winter rainfall region and unless there is significant storage capacity, rainwater systems are unable to supply water during the dry months. Despite this, the demand for rainwater systems has significantly increased and there are backlogs in the supply of components, especially tanks. Western Cape based tank manufacturers are booked up several months in advance and many local installers are forced to source tanks from elsewhere in the country.

There are opportunities for businesses to design, build, manufacture, install and maintain cost-effective rainwater harvesting systems, particularly for indoor use (e.g. toilet flushing and laundries). Figure 24 compares potential rainwater harvesting yields in Cape Town (a winter-rainfall region) and George, where rainfall is more consistent throughout the year, for a small residential home using the WRC CSAG Water Harvesting Tool[35].

Seawater desalination: There are also opportunities for seawater desalination for large residential, commercial and industrial developments located adjacent to the coast. For example, some of the large industrial companies in Saldanha Bay Municipality have recently procured or are in the process of procuring seawater desalination, representing a combined opportunity of around 4 MLD, or R44 million per year for 20 years[36]. Opportunities relating to seawater desalination are discussed in more detail in Section 4.3.2.

34 Assuming 5% of WC households (i.e. 90 000) are able to invest in higher-end groundwater or rainwater systems, costing ~R50,000, and a further 9% of households (162 000) are able to invest in low-cost systems, costing ~R8,000 (see costing later in this section).

35 Available at http://cip.csag.uct.ac.za/webclient2/waterharvest/. Assumptions: 50m^2 roof area, 5m^3 storage capacity, no first flush, tiled roof

36 Assuming a 20-year offtake agreement at a fixed sale price of R30/m^3.

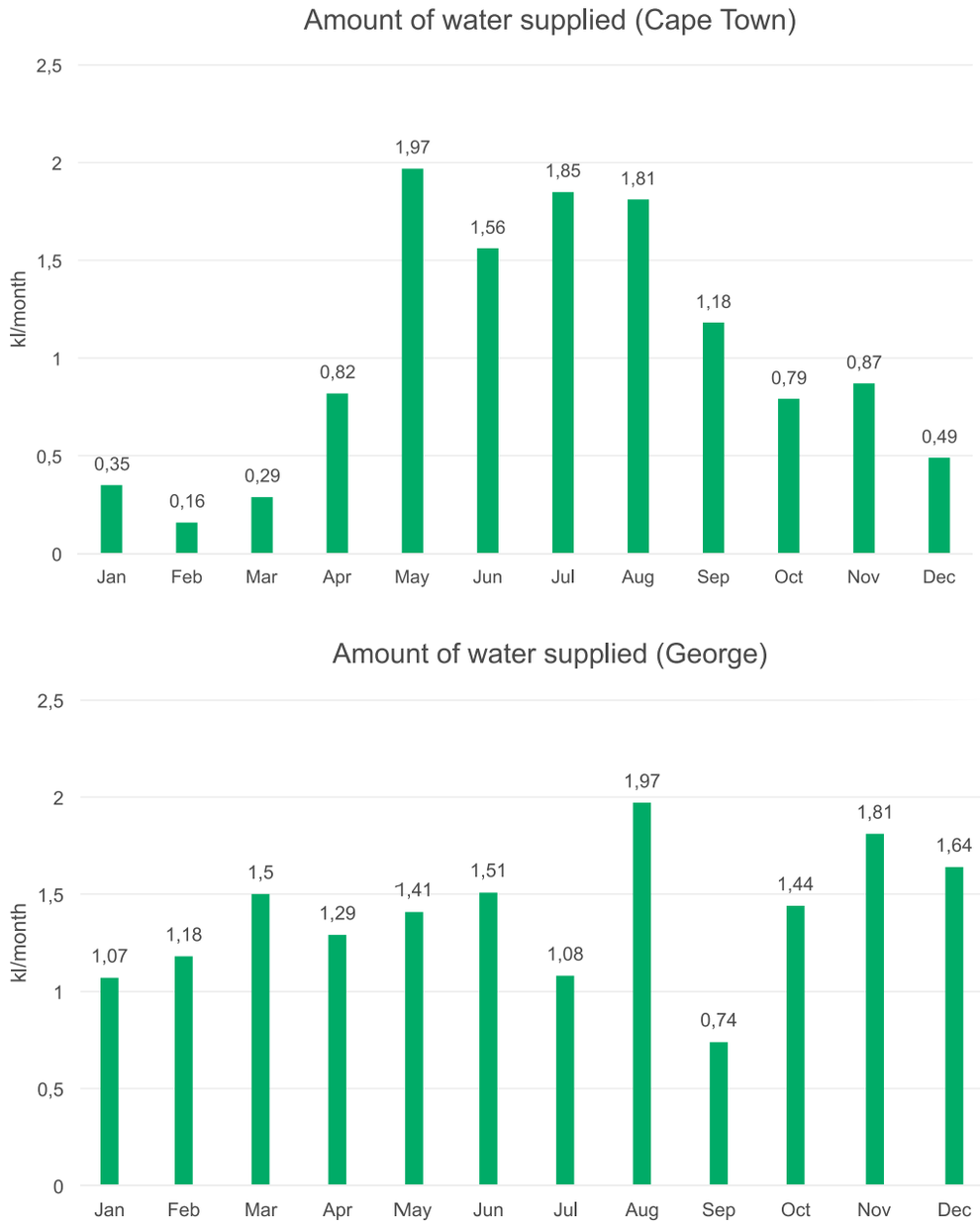

Figure 24: Estimated rainwater harvesting potential for a small home in Claremont, Cape Town (top) and George (bottom)

Financing: In the residential sector in particular, capital costs can be a barrier to the adoption of alternative water supply.

- Indoor-use rainwater harvesting systems start at ~R8 000 but can easily cost up to R50 000 for larger systems.
- The cost of installing a well point (5m –10m deep) has increased substantially in the last 12 months, and now ranges between R4 500 and R8 000, depending on the depth and number of wells needed.
- Shallow well pits cost ~R40,000, and boreholes (40m – 100m+) can cost between R50 000 and R150 000.
- Depending on the water quality of the rainwater, well or borehole water, the intended use, and the daily volume needed, additional filtering costs start at around R15 000 and can easily cost R50 000 for more advanced units that include mechanical filters, UV filters and reverse osmosis (RO) processes.

Homeowners looking to opt for alternative water installations may not have easy access to the necessary capital and are sometimes remortgaging their homes to pay for these systems, which incurs high transaction costs. There are opportunities for innovative financing mechanisms, including Property Assessed Clean Energy (PACE) or Pay As You Save (PAYS) solutions, that have been successful internationally.

Drivers

The key drivers for this market are the same as those outlined in detail in Section 4.2.2 for reuse and water efficiency opportunities, i.e. the risk of insufficient water supply (which significantly improves the business case for these systems), water restrictions, social responsibility and regulatory requirements.

Barriers

The market entry barriers are similar to those outlined in detail in Section 4.2.2 for reuse and water efficient technologies. These include challenges relating to leased properties, plumbing skills, and capital costs (especially where treatment is required). In addition, there are some technology-specific barriers.

Barriers specific to groundwater use

- **Complexity:** Unlike surface water, groundwater availability is difficult to predict, requires specialist skills and can only be confirmed once drilling and yield testing has been undertaken. As a result, groundwater characteristics are often misunderstood by non-professionals or are inaccurately communicated, leading to public mistrust and undervaluation of the resource.
- **Brine disposal:** Saline (brackish) groundwater requires treatment with reverse osmosis prior to use. The resulting concentrated waste stream (brine) is difficult to dispose of as it often exceeds the municipal wastewater maximum permitted discharge limits for electrical conductivity (500mS/m for the City of Cape Town).
- **Water use licences:** As outlined in Section 3.1.1, DWS has committed to a maximum turnaround time for water use licence (WUL) applications of 300 working days. These timeframes can deter commercial and industrial businesses from installing groundwater systems (reasonable domestic use does not require a WUL).

4.3.2. Municipal market: alternative water supply

As shown in Figure 6, most Western Cape municipalities require immediate urgent interventions to avoid running out of water in the short term, and many are investigating alternative water supply. For example, Saldanha Bay Municipality's plans include increased groundwater supply and permanent desalination. On a larger scale, the CoCT is in the process of investing in significant alternative water supply (including groundwater, seawater desalination and reuse) – as outlined in Table 2. Providing ~400 million litres a day (MLD) of additional water supply from these sources (assuming 160MLD from groundwater, 75MLD from reuse and 150MLD from seawater) is projected to cost the City ~R6bn, representing a significant market for the private sector (CoCT 2018b).

Opportunities

Groundwater systems and services: As outlined in Section 4.3.2, there is substantial potential for municipal-scale groundwater development (DWS 2017b). Increasingly, municipalities are emphasising groundwater as a priority supply augmentation option, especially in response to the drought. This is because groundwater is currently relatively abundant, quick to access and cost effective relative to other alternative (and reuse) water sources (see Table 5).

- Long-term groundwater projects are also being explored by several municipalities, including Stellenbosch, Berg River and Saldanha Bay (Jacobs 2017). There are immediate opportunities for groundwater systems and services in this market and longer-term opportunities in managed aquifer recharge.
- Groundwater development companies and technologies coupled with advanced water treatment solutions are expected to be of interest to private equity investors.

Seawater desalination: Globally, the desalination market is growing fast (Figure 25, Zotalis et al. 2014) and it is likely to play a significant role in long-term water supply.

- In the coastal towns and cities of the Western Cape there are immediate opportunities for small-scale seawater desalination projects. The CoCT has shifted its interest from small-scale temporary desalination towards permanent large-scale desalination. This is predominantly due to the economies of scale, as shown in Table 6 (GreenCape analysis[37]).
- Desalination will primarily be developed by metros, with Cape Town, eThekwini (KwaZulu-Natal) and Nelson Mandela Bay (Eastern Cape) all exploring their options for large-scale permanent plants.

37 | The analysis draws from a range of sources including project developers and consultants, tender submissions and personal communications with global desalination consultant Nikolay Voutchkov from Water Globe Consultants.

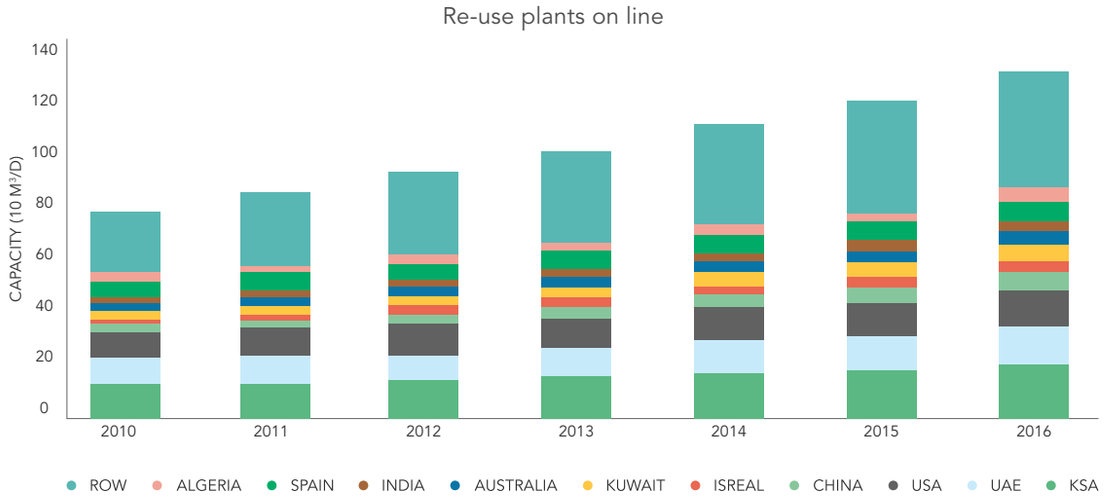

Figure 25: Global installed desalination capacity, 2010 – 2016

The private sector will have a significant role to play, with almost all desalination plants being developed and operated by a consortium of private companies that hold long-term offtake agreements with utilities or municipalities.

- **Financing**, in a combination of equity and debt, usually contributes 15% to 20% to the total cost of water production. Globally, equity returns in desalination projects are typically at least 14%, with higher returns (up to 18%) usually expected in higher risk countries, e.g. those with junk bond rating. The experience from international projects is that profit margins tend to increase over the course of the project lifespan as water charges are usually inflation-linked, while costs of production tend to decrease due to advances in technologies. The equity market is still developing an understanding of the risks of these projects, but the opportunity lies in partnering with reputable technology providers (Voutchkov 2017).

Drivers

- Water scarcity is a key driver for the interest in and the implementation of alternative water systems.
- The need for certainty of supply and a resilience to climate change are also important drivers for seawater desalination. Desalination is often identified as the 'ultimate endless resource', providing the highest assurance of supply — assuming the energy, capital, environmental and demand-side risks can be adequately addressed.

Barriers

Growth of the alternative water supply market is hampered by a number of general barriers already discussed in Section 4.3, namely access to funding, municipal implementation capacity, credit-worthiness and procurement processes. The barriers to groundwater opportunities have also been discussed in Section 4.3.1, which deals with barriers in the private sector market.

Table 6: Indicative costs and timeframes for various water treatment projects

Type of treatment plant	Typical cost of water per m^3 [38]	Typical implementation timeframes [39]
Large-scale permanent seawater desalination 100-150 MLD	USD 0.85 – 1.3[40] (ZAR 12 – 18)	24 months
Small-scale permanent seawater desalination <10 MLD	>USD 2 – 4 (ZAR 28 – 56)	14-16 months
Small-scale temporary desalination <10 MLD (2-year contract)	>USD 3.5 – 6 (ZAR 49 – 84)	6-14 months
Potable water reuse	USD 0.6 – 1.2 (ZAR 8 – 17)[41]	>12-18 months
Groundwater development	Highly variable USD 0.5 – 1.1 (ZAR 7 – 16)	Highly variable
SA average raw water tariffs (2015/16) [42]	ZAR 1.98	n/a
SA average bulk water tariffs (2015/16)[43]	ZAR 7.44	n/a

Barriers specific to seawater desalination

Financial risk: Numerous local and international case studies show that developing permanent seawater desalination as an emergency drought response can lead to significant unintended political and debt consequences. Unless a permanent desalination project addresses a baseline water shortage in the longer term as part of a water supply mix, there is likely to be an element of demand-side risk[44]. When desalination is used as a drought response in a region that is not perennially dry, the demand-side risk is especially acute. Australia's Millennium Drought Response Desalination Programme, costing R153 billion in the last decade, has seen several plants not being used optimally, resulting in significant public financial implications.

Local manufacturing: While the local market for reuse and desalination is growing, traditional reverse osmosis membrane manufacturing opportunities are limited because of extremely high manufacturing sophistication and capital requirements.

Cost recovery: Desalinated seawater is generally more expensive than bulk water tariffs from traditional surface water or groundwater supply, as shown in Table 5. These additional costs ultimately have to be passed on to the water user, but municipalities are often unable or reluctant to substantially increase water tariffs. This presents a barrier to the adoption of municipal-scale seawater desalination projects, as well as potable reuse projects. However, it is possible for municipalities to structure desalinated water offtake agreements, such that the price ramps up over an initial period, as has been done internationally (Voutchkov 2017).

38 Assuming a 20-year contract, and excluding the cost of connecting to existing reticulation infrastructure. As a rule of thumb, it costs around USD 1 million per km to connect to reticulation systems (Voutchkov 2017). It was assumed that USD1 is ~ZAR14.
39 Timeframes to design, build and commission plants (excludes procurement processes, permitting and licensing, etc.)
40 The cost of water can even be as low as USD 0.65/m^3 in certain circumstances, e.g. freshwater plumes in the intake zone, reducing the salinity of the water
41 Assuming the wastewater treatment plant from where the water is supplied is operating satisfactorily, and that no upgrades are undertaken on the wastewater treatment plants.
42 Untreated water from rivers, dams, springs and boreholes, including a water resource management and infrastructure charge.
43 Includes costs of bulk water treatment and conveyance.
44 Permanent systems can operate as low as 30% of their capacity without impacting on efficiency, cost or lifespan of the membranes, which gives these systems a degree of flexibility (Voutchkov 2017).

Project complexity: Desalination projects are complex, and most South African municipalities do not have experience in procuring these technologies. This can lead to poorly specified (and unbankable) tenders, higher bid prices, fewer bid submissions, project delays, and the risk of tenders being awarded to contractors that are unable to deliver. As an example, some of the initial temporary desalination tenders were deemed non-responsive in the CoCT's emergency water augmentation programme.

Access to energy infrastructure is a major constraint for the siting of desalination projects. Although the energy requirements of large-scale seawater desalination plants have decreased over time (see Figure 26; Coetzee 2017), the requirements are still significant. The most efficient systems currently use between 3 and 3.5 kWh per m^3 of water produced. Typical large-scale seawater desalination plants procured by a metro will be one of the biggest point-consumers of energy in the local distribution system. For example, a 450 MLD plant in Cape Town could potentially use around 7% of the City's electricity demand (DWS 2017b). However, advances in process optimisation, control and energy recovery have allowed some plants to be designed for time-of-use energy sensitivity.

Brine disposal: A concentrated wastewater stream (brine) is produced when seawater is desalinated using reverse osmosis, which is the most common technology. The brine is typically discharged to sea, which is less of an environmental barrier than when inland disposal is required, e.g. where brackish groundwater requires treatment at inland sites. The diversity and sensitivity of ocean habitats must be considered. Cape Town has a number of marine protected areas (MPAs) where brine disposal is generally not permitted, and this is expected to be the case for other coastal municipalities as well.

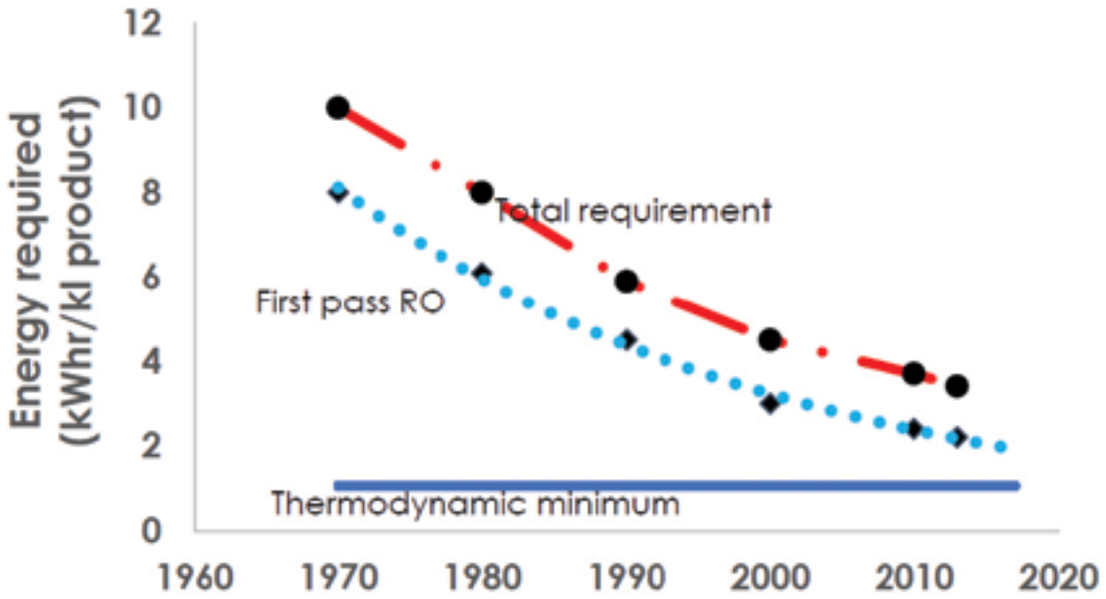

Figure 26: Energy required for seawater desalination

5 – Funding and incentives

A range of sector-specific and general funding solutions and incentives are available to investors, manufacturers and service companies in the green economy. These cover Development Finance Institutions (DFI), local public and private sector financiers and investors, and a considerable range of tax incentives.

5.1. Water sector funding and incentives

Table 7 below outlines additional sources of funding and incentives relevant to the water sector

Table 7: Water sector funding and incentives

Funding / incentive	Description	Link to source
Industrial effluent rebate	The City of Cape Town grants industrial effluent rebates in instances where capital budget expenditure has been purposed by the owner to avoid detrimental impact to municipal infrastructure; to improve the quality of industrial effluent and quantity discharged into the municipal system.	https://goo.gl/UxPZA6
Critical Infrastructure Programme (CIP)	CIP is a cost-sharing incentive for infrastructure projects offered by the Department of Trade and Industry (dti). Construction of bulk water supply projects is one of the types of infrastructure supported through the programme.	(See pages 40-41) http://www.thedti.gov.za/financial_assistance/financial_incentive.jsp?id=3

5.2. General funding opportunities

5.2.1. Green Finance Database

The GreenCape Finance Desk, in conjunction with the South African National Energy Development Institute (SANEDI), maintains a database of funding sources and primarily dti-driven incentives that may be relevant to green economy investors

The database contains information on nearly 100 funding opportunities, including an overview of the opportunity and the contact details and links. It is ideal for any entity seeking a broad range of funding solutions and financial incentives, with South African institutions being the main source of opportunities.

The database is available to view and download online[45].

5.2.2. Other databases

Finfind Database

Finfind (www.finfindeasy.co.za) is an innovative, online finance solution that brings together SME finance providers and those seeking finance. With a focus on finance readiness, Finfind has over 200 lenders and over 350 loan products available to SMEs.

The database is ideal for South African SMMEs who are seeking funding and/or business advisory services, or those who aim to improve their understanding of finance matters.

45 | https://www.greencape.co.za/assets/Uploads/GreenCape-Finance-Database-v4.xlsx

AlliedCrowds Database
AlliedCrowds[46] is the first complete aggregator and directory of alternative finance providers in the developing world.

Sign up is free and allows users to access a global database where one can filter for sector (including greentech, agriculture and social impact), type of capital (equity, lending, grant) and type of funding (crowdfunding, angel investing, venture capital, impact investing). The Entrepreneur Hub provides significant tools and assistance for start-ups, including, assistance on writing business plans and financial resources. This database is ideal for any entity seeking a broad range of financial solutions.

Further funding sources
Two more South African funding directories can be downloaded in PDF format from the GreenCape Green Finance Database webpage[47].

5.2.3. Ecosystem observations

Funding gaps of note
Excellent work has been done to fund large-scale projects, such as the utility-scale Renewable Energy Independent Power Producer Procurement Programme (REIPPPP). However, because of the relatively smaller pool of domestic funding and capital-intensive nature of the cleantech industry, a number of funding gaps remain for SMEs in particular.

- **The amount of money available for pilot projects is limited.** This is partly because clean technologies (hardware) must compete against software technologies, which can be 10x cheaper to fund at any given stage of development.
- **Small-scale project finance (up to R50 m) is difficult to acquire,** as funders of projects are looking for projects worth at least R50 m (usually R100 m) to make their involvement profitable. Rand Merchant Bank's FIRST initiative has begun to address this issue in the renewable energy space.

Skill gaps
Funders often experience a shortage of in-house technical expertise to understand the business case and models of cleantech ventures.

SME founders, particularly on the start-up side, show an aversion to financial matters. The promotion of financial literacy and fluency by initiatives such as Finfind has gone a long way in encouraging businesses to recognise the importance of financial matters and take responsibility for understanding the finance in their organisation.

46 | www. alliedcrowds.com
47 | www.greencape.co.za/content/focusarea/green-finance-databases

5.2.4. How the GreenCape Green Finance Desk assists investors

The Green Finance Desk (GFD) primarily acts as data source, working across all sector desks at GreenCape. Its objectives are to:

- develop a network of financial institutions (private and public) with green finance interests;
- develop an understanding of the main green projects requiring investment / financing;
- break down any barriers that exist between green finance and green projects;
- facilitate the implementation / adoption of innovative financing solutions for green economy business models; and
- provide ad hoc support to programmes and initiatives requiring a financial / investment viewpoint.

5.3. Manufacturing incentives

A proposal has been submitted for the Atlantis Industrial Area to be declared a Greentech Special Economic Zone. The dti's SEZ programme aims to increase industrialisation, economic development and job creation around the country. The dti has proposed a number of incentives to attract investors into the proposed SEZs, which include:

- **Reduced Corporate Income Tax Rate:** qualifying companies will receive a reduced corporate tax rate of 15%, instead of the current 28% headline rate.
- **Employment Tax Incentive (ETI):** aimed at encouraging employers to hire young and less-experienced work seekers. Hiring young people will reduce the cost to employers through a cost-sharing mechanism with government.
- **Building Allowance:** qualifying companies will be eligible for an accelerated depreciation allowance on capital structures (buildings). This rate will equal 10% a year over 10 years.
- **VAT and Customs Relief:** companies located within a customs-controlled area (CCA) will be eligible for VAT and customs relief as per the relevant legislation (dti 2015).

Other incentives available to investments in a designated SEZ will include:

- a 12I Tax Allowance Incentive.
- an SEZ fund for infrastructure development within the designated area.

Within Atlantis, the City of Cape Town has made vast tracts of land available at low cost for lease by greentech companies through an accelerated land disposal process. GreenCape's Atlantis SEZ team and the InvestSA One Stop Shop can assist with information, and facilitate access to permits, licences, planning and development approvals, incentives and finance. It is also worth noting that the dti has been willing to assure investors that investing prior to SEZ designation will not disqualify them from receiving benefits once the zone is designated.

6 – The Western Cape: Africa's green economy hub

The Western Cape is a world-class investment destination.

The province provides businesses and investors with prime locations, modern infrastructure, a skilled workforce, low operational costs and an abundance of natural resources. It is also a sought-after place to live, with unrivalled natural beauty, vibrant culture, excellent schools and universities, and an outstanding quality of life. Cape Town has been ranked among the top 21 global investment destinations by Foreign Direct Investment (fDi) Intelligence, a division of the Financial Times.

A great place for green business

There are compelling reasons why the Western Cape Province is viewed by many as Africa's green economy hub. Coupled with a strong and rapidly growing market for green technology and services in South Africa and beyond, the Western Cape offers:

- Africa's renewable energy (RE) and cleantech hub, with a critical mass of leading companies present.
- Local presence of major professional services and financiers.
- Significant market opportunities for businesses and investors in agriculture, energy services, utility scale solar and wind, waste, water, bioeconomy and resource efficiency.
- A supportive government that has made ease of doing business and the green economy key priorities.
- Five universities with comprehensive R&D capabilities and dedicated green economy skills programmes.
- A range of investment incentives in the proposed Atlantis Greentech Special Economic Zone (SEZ).

Supporting businesses and investors

The province also offers dedicated support for businesses and investors focusing on greentech and services, including:

InvestSA One Stop Shop: Offers convenient investor support on permits, licensing and registrations - all under one roof.

GreenCape: Provides dedicated support and market intelligence to green economy sectors.

Wesgro: The official investment and trade promotion agency for the Western Cape.

SAREBI: A business incubator providing non-financial support to green entrepreneurs.

SARETEC: Offers specialised industry-related and accredited training for the wind and solar industries.

Market opportunities in the province and South Africa

Some of the major market opportunity areas in the province and South Africa in the next five years are outlined in the graphic on the next page (see individual MIRs and the GreenCape website for more information).

R&D capabilities and skills

The region's five universities – University of Cape Town, Stellenbosch University, University of the Western Cape, the Cape Peninsula University of Technology and the George campus of the Nelson Mandela Metropolitan University – underpin all of this with comprehensive research and development (R&D) capabilities and dedicated green economy skills programmes.

Major market opportunities: Western Cape and South Africa

Agriculture

Precision agriculture
Tools, data analysis, local manufacturing & financing to support precision farming & resource efficiency (SA)

Solar energy for agriculture
Minimum markets of R120m (WC) & R420m (SA) for solar PV in agri & agri-processing

Controlled environment agriculture
R128m invested in 2017 (WC); R600m potential market (WC), 15% growth p.a. (WC)

Energy services (SA-wide)

Solar PV systems & components
500MWp installed capacity; R1.2bn additional investment in 2018 (R7.2bn to date)

Local manufacturing & assembly
Solar PV systems and components – systems require compliance with local content regulations

Energy storage
Keystone of future energy services market; ~R80m market by 2023

Utility scale renewable energy (SA-wide)

Independent power production
Ministerial determination for 6.3 GWp more RE generation capacity: 1.1 GW (670 MW wind, 450 MW solar) p.a.

Rest of Africa
RE deployment in the rest of Africa, some programmes mirroring REIPPPP

Local manufacturing
Through REIPPPP local content requirements

Waste

Municipal PPP
Public-private partnership projects of R1.3bn (WC)

Organic waste treatment
Providers planning capacity growth from 381 000 t/a to 1 million t/a

Alternative waste treatment
R421/t landfill cost in CT (highest in SA); organic waste landfill ban by 2027 (5 year 50% diversion target by 2022)

Water

Metering & monitoring
30-50% smart metering sales growth (Q1 2018 compared to Q1 2017)

Water efficiency & reuse
R900m p.a. potential market for new commercial and residential developments (WC)

Alternative water
R5.8bn potential residential market (WC); 14%-18% returns on large-scale desalination investments

Bioeconomy & resource efficiency

Food value retention
R600m value through improved cold chain management & waste reduction (WC)

Solar thermal
R33m already installed (WC), R135m (SA); R3.7bn potential agri-processing market

Biogas
For electricity, heating & transport; R100m installations expected by 2023

Atlantis Greentech Special Economic Zone (SEZ): investment incentives

The City of Cape Town established a greentech manufacturing hub in Atlantis in 2011 in response to the government's focus on localisation of manufacturing as part of the Department of Energy's Renewable Energy Independent Power Producer Programme (REIPPPP).

The City has made tracts of land available at low cost for lease by greentech companies through an accelerated land disposal process. A number of other financial and non-financial incentives are also on offer, including discounted electricity and rapid turnaround on development applications.

An application has now been submitted by the Western Cape Provincial Government for the Atlantis Industrial area to be declared a Greentech SEZ, a decision on which is expected in 2018. GreenCape's Atlantis SEZ team can assist with information, and facilitate access to permits, licenses, planning and development approvals, incentives and finance.

7 – GreenCape's support to businesses and investors

GreenCape is a non-profit organisation that drives the widespread adoption of economically viable green economy solutions from the Western Cape. Our vision is for South Africa to be the green economic hub of Africa.

We work with businesses, investors, academia and government to help unlock the investment and employment potential of greentech and services, and to support a transition to a resilient green economy.

We assist businesses by removing barriers to their establishment and growth and provide our members with:

- free, credible and impartial market information and insights
- access to networks of key players in government, industry, finance and academia
- an advocacy platform to help create an enabling policy and regulatory environment for green business

We assist local, provincial and national government to build a resilient green economy by providing:

- support on the development of standards, regulations, tools and policies
- expert technical knowledge on key sectors in the green economy
- access to networks of key players across business, academia, and internationally

Since inception in 2010, GreenCape has grown to a multi-disciplinary team of over 40 staff members, representing backgrounds in finance, engineering, environmental science and economics.

From these investments, more than 10 000 jobs have been created. Through our WISP (Industrial symbiosis) programme, by connecting businesses with waste / under-used resources, we have to date diverted over 27 200 tonnes of waste from landfill.

We have facilitated and supported R17bn of investments in renewable energy projects and manufacturing. From these investments, more than 10 000 jobs have been created. Through our WISP (industrial symbiosis) programme, by connecting businesses with waste / under-used resources, we have to date diverted over 4360 tonnes of waste from landfill.

Our market intelligence reports form part of a working body of information generated by sector desks and projects within GreenCape's three main programmes – energy, waste and resources.

Figure 7 below shows the different focus areas within each of our programmes.

Benefits of becoming a GreenCape member
We currently have over 1 100 members, and offer free membership. Becoming a member of GreenCape will give you access to the latest information regarding developments in the various sectors; access to tools, reports, and project information; and offer you the opportunity – through our networking events – to meet and interact with various stakeholders in the green economy.

1 Renewable Energy

Utility-scale projects, localisation of component manufacturing, electric vehicles & alternative basic electrification

2 Energy Services

Commercial, industrial & agricultural energy efficiency & embedded generation; incentives & financing options.

3 Alternative Waste Treatment

Municipal decision-making & policy & legislative tools on alternative waste treatment options; small-scale biogas, recycling & reuse (dry recyclables, construction & demolition waste).

4 Western Cape Industrial Symbiosis Programme (WISP)

The team matches businesses to share unused resources, cut costs & create value. They also support entrepreneurs to identify & realise new business opportunities in the waste industry.

5 Water

Water provision & economic development; greentech opportunities for water use efficiency, treatment & reuse.

6 Sustainable Agriculture

Precision-, conservation- and controlled environment-agriculture; valorisation of wastes to high value bio-products, including bio-energy.

Figure 7: GreenCape's focus areas

Cross-border matchmaking through the International Cleantech Network
GreenCape's membership of the International Cleantech Network (ICN) gives our members access to international business opportunities in countries where other cleantech clusters are based (mainly Europe and North America).

For investors looking for opportunities in South Africa, GreenCape's Cross-border Matchmaking Facility offers a business matchmaking facility for green firms and entrepreneurs.

The matchmaking team helps international inbound firms and entrepreneurs looking for South African partners in the green economy. The team assists with contacts, introductions and matches to South African businesses.

They also offer matchmaking activities for trade offices, missions and other inbound interests. These services can be accessed via the ICN passport or directly with GreenCape.

To become a member or to get your ICN passport, please contact GreenCape or visit our website: www.greencape.co.za

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