



Waste

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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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List of acronyms and abbreviations

AD	Anaerobic digestion
AWT	Alternative waste treatment
C&DW	Construction and demolition waste
C&I	Commercial and industrial
CoCT	City of Cape Town
CCA	Customs-controlled area
DEA	Department of Environmental Affairs
DEA&DP	Western Cape Department of Environmental Affairs and Development Planning
DEDAT	Western Cape Department of Economic Development and Tourism
Doe	Department of Energy
DST	Department of Science and Technology
dti	Department of Trade and Industry
EIA	Environmental impact assessment
eWASA	e-Waste Association of South Africa
EPR	Extended producer responsibility
ETI	Employment tax incentive
GDP	Gross domestic product
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
GRI	Gestamp Renewable Industries
GW	Gigawatt
IDC	Industrial Development Corporation
IT	Information technology
ITAC	International Trade Administration Commission of South Africa
IPP	Independent power producer
ISO	International Organization for Standardization
IIWTMP	Integrated Industry Waste Tyre Management Plan
IndWMP	Industry Waste Management Plan
IWMP	Integrated Waste Management Plan
KfW	Kreditanstalt für Wiederaufbau (Reconstruction Credit Institute)
KfW Entwicklungsbank	KfW Development Bank
kWh	Kilowatt-hours
LDPE	Low-density polyethylene
MFMA	Municipal Finance Management Act, No. 56 of 2003
MIG	Municipal Infrastructure Grant
MIR	Market intelligence report
MRF	Material recovery facility
MSA	Municipal Systems Act, No. 32 of 2000
MSW	Municipal solid waste
MW	Megawatt(s)
NDP	National Development Plan
NEMA	National Environmental Management Act, No. 107 of 1998
NEMWA	National Environmental Management: Waste Act, No. 59 of 2008
NPSWM	National Pricing Strategy for Waste Management
NWIB	National Waste Information Baseline
NWMS	National Waste Management Strategy

ORASA	Organic Recyclers Association of South Africa
PE-HD	High-density polyethylene
PE-LD	Low-density polyethylene
PE-LLD	Linear low-density polyethylene
PET	Polyethylene terephthalate
PETCO	PET Recycling Company of South Africa
Polyco	Polyolefin Recycling Company
PP	Polypropylene
PPP	Public-private partnership
PRASA	Paper Recycling Association of South Africa
PRO	Producer responsibility organisation
PS	Polystyrene
PS-E	Polystyrene expanded
PSPC	Polystyrene Packaging Council
PVC	Polyvinyl chloride
R&D	Research and development
RDF	Refuse delivered fuels
REDISA	Recycling and Economic Development Initiative of South Africa
REEEP	Renewable Energy and Energy Efficiency Partnership
REIPPPP	Renewable Energy Independent Power Producer Procurement Programme
rPET	Recycled polyethylene terephthalate
SABIA	Southern African Biogas Industry Association
SAEWA	South African e-Waste Alliance
SALGA	South African Local Government Association
SANEDI	South African National Energy Development Institute
SAVA	Southern African Vinyls Association
SAWIS	South African Waste Information System
SEZ	Special economic zone
SMEs	Small- and medium-sized enterprises
SMMEs	Small, medium and micro-sized enterprises
StEP	Solving the e-waste problem
TA	Transactional Advisor
TGRC	The Glass Recycling Company
UNIDO	United Nations Industrial Development Organization
VAT	Value-added tax
WCG	Western Cape Government
WCPS	West Coast Power Solutions
WISP	Western Cape Industrial Symbiosis Programme
WMB	Waste Management Bureau
WtE	Waste to energy
WWTW	Wastewater treatment works



Executive summary

The South African waste management landscape is set to experience a raft of legislative and regulatory changes that will advance the country toward a more resource-efficient economy. This will create opportunities for business and investors in the waste sector who focus on plastics, organics, e-waste, and construction and demolition waste.

Disposal continues to dominate the South African waste landscape. Based on official 2011 estimates, 108 million tonnes of waste material were generated that year, of which 10% was recycled or reused with the remaining 90% landfilled (DEA 2012). The national Department of Environmental Affairs (DEA) has extrapolated the 2011 statistics to unofficially represent 2016 estimates. These show the generation of 111 million tonnes of waste in 2016, of which 83 million tonnes (75%) were landfilled. Furthermore, a large proportion, approximately 65 million tonnes (59%), was handled by local municipal waste management systems (DEA 2017).

The Western Cape generates an estimated 7.7 million tonnes of waste annually, of which 3.6 million (47%) consist of commercial and industrial waste. The remaining 4.1 million tonnes (53%) is municipal solid waste (MSW). Of the total for the province, the City of Cape Town (CoCT) generates a substantial portion (48%) of the waste, which includes 2.8 million tonnes (36%) of MSW and 0.9 million tonnes of commercial and industrial waste (12%).

Household waste is managed by municipalities and/or by their appointed service providers. Commercial and industrial waste is typically managed by the private sector in larger municipalities, and to some extent the municipalities themselves. Although private stakeholders also own landfills, municipal landfills are open for private sector disposal.

According to DEA (2017), the waste economy contributed approximately R24.3 billion to the South African GDP in 2016. It provided 36 000 formal jobs and supported an estimated 80 000 informal jobs/livelihoods. A further R11.5 billion per year could be unlocked by 2023 by diverting up to 20 million tonnes of waste (DEA 2017). The anticipated spin-offs could

include 45 000 additional formal jobs and 82 000 indirect jobs, as well as the creation of 4 300 SMMEs. The DEAs' overall target is to increase waste diverted from landfill from an estimated 13% (14 million tonnes) in 2016 to 25%¹ (29 million tonnes) by 2023; hence greater business and job creation benefits are expected.

The waste sector is broad and complex, consisting of various waste streams, stakeholders and technologies. This provides a variety of opportunities:

- **Organics:** Solutions are needed for municipal green waste, abattoir waste, and the organic fraction of municipal solid waste (MSW); there is also biogas investment potential of R100 million.
- **E-waste:** The forthcoming promulgation of an e-Waste Industry Waste Management Plan (IndWMP), coupled with a national focus on legacy electronics, signal a rise in the availability of e-waste. This will provide an increase in feedstocks for dismantlers and refurbishers, and an opportunity to establish the Western Cape's first licensed processing facility for processing large volumes of e-waste.
- **Plastic:** The promulgation of the paper and packaging IndWMP will unlock greater volumes of clean feedstocks and more business support for the sector, with further support likely through Operation Phakisa. There is a need for thermal treatment technologies for dirty mixed plastics, refuse derived fuels (RDF) and thermoform PET

- **Builders' rubble:** The supply of and demand for builders' rubble as an alternative to virgin material are growing. National government and local municipalities are focusing increasingly on diverting rubble from landfill. The private sector is starting to consider builders' rubble as an alternative, in the context of rising virgin material costs. Crushing contracts in Stellenbosch and CoCT, green procurement by the private sector, and red tape reduction are further unlocking reuse potential of builders' rubble.
- **Municipal contracts:** A number of municipalities will need waste related infrastructure development / expansion / maintenance over the next three years. They include CoCT; Eden District; and the Drakenstein, Knysna, Langeberg, Saldanha, and Stellenbosch local municipalities.
- **Opportunities identified through industrial symbiosis** include the need for solutions for slag (540 000 tonnes/year), paper/pulp effluent (240 000 tonnes/year), foundry sand (74 000 tonnes/year), treated wood (760 000 tonnes/year), laminate glass (200 tonnes/year) and cardboard cores (170 tonnes/year).

Key drivers of these opportunities include:

- **Legislation and regulation:** New and changing national and provincial legislation and regulations are set to unlock a number of key waste streams, notably organics. These changes will also help to simplify rules and procedures for alternative waste treatment technologies and activities.
- **Industry waste management plans:** The paper and packaging, e-waste and lighting industries will be legally required to implement mechanisms to ensure extended producer responsibility. This will ensure access to feedstock, and support demand for recovered materials.
- **Government initiatives:** The initiatives identified by the national government's fast results delivery programme, Operation Phakisa, should increase access to feedstock and stimulate growth in market demand.
- **Cost of disposal:** Dwindling landfill space and rising management costs are pushing up the price of landfilling in the Western Cape, and the CoCT in particular. This increases demand from waste generators for alternative waste treatment solutions, which in turn improves the financial viability of solutions.

¹ | Of the 2012 waste figures.

What's new?

For investors and business owners who have read GreenCape's 2017 Waste MIR, the following are new developments discussed in this report of which they should take note:

- **Industry Waste Management Plans:** The National Environmental Management: Waste Act (59 of 2008) Section 28 Notice was published on 6 December 2017. It calls for the paper and packaging, electrical and electronic, and lighting industries to submit industry waste management plans (IndWMPs) to the Minister of Environmental Affairs for approval. IndWMPs must be submitted to the Minister by 6 September 2018 and producers (including converters and refurbishers) must register with the Minister by 6 February 2018.
- **Operation Phakisa: Chemicals and Waste Economy:** The national Department of Environmental Affairs (DEA) chemical and waste economy programme has engaged extensively with stakeholders through Operation Phakisa². The engagements aimed to identify key waste issues and government / private sector initiatives to pursue. The 2017 Operation Phakisa: Chemicals and Waste Economy embodies the political will to implement enabling legislation that would promote waste beneficiation. DEA has identified 20 initiatives across four work streams to divert 20 million tonnes of waste from landfill. If implemented, this could unlock an additional R11.5 billion per year to help create 45 000 direct jobs and 4 300 small, medium and micro-sized enterprises (SMMEs).
- **Promulgation of National Norms and Standards for Sorting, Shredding, Grinding, Crushing, Screening or Baling of General Waste** (GN 1093 of 2017): It has removed the legislative hurdle of requiring an environmental authorisation / waste management licence for waste-handling facilities with an operational area greater than 1000 m².
- **Waste tyre management plan withdrawn:** In October 2017, the national Department of Environmental Affairs (DEA) withdrew the Integrated Industry Waste Tyre Management Plan submitted by the Recycling and Economic Development Initiative of South Africa (REDISA). The Minister has since published a call for new plans to be submitted. The DEA Waste Management Bureau (WMB) has been managing the waste tyre stream in the interim until another plan is approved.
- **National Minimum Wage Bill:** The National Minimum Wage Bill (B 31-2017) is expected to be enacted by May 2018. The legislation introduces a blanket minimum payment (R20/hour or R3 500 per month [for a 40-hour week]) for most South Africans in employment, including those in the waste sector.
- **Organics landfill diversion targets (Western Cape):** The Western Cape Government (WCG) Department of Environmental Affairs and Development Planning (DEA&DP) has made the bold decision to implement an organic waste diversion plan. The plan seeks to divert 50% of organic waste from landfill by 2022, and to achieve 100% diversion by 2027. The plan will include addendums to the licences of waste disposal facilities. These addendums will require municipalities to set annual targets and identify procedures to meet the organic waste diversion targets. In effect, this will restrict disposal of all organics to Western Cape landfills by 2027. The underlying motivation is to divert organics from landfill. This will reduce the need to comply with stricter landfill designs required by national government, which would otherwise have substantial (and potentially unaffordable) cost implications for local municipalities.
- **Landfill gate fee increases (City of Cape Town):** CoCT is to increase its landfill gate fees for both general and hazardous waste. Indications are that general waste fees will increase well beyond inflation (5.33%) year on year for the next three years. The CoCT will confirm the new gate fees in the first quarter of 2018.

¹ | A cross-sector, fast-results delivery programme launched in 2014 to help implement the National Development Plan.

1 – Introduction and purpose

This report provides insights into opportunities for investors and businesses active or interested in providing alternative waste treatment solutions to the South African market, with particular focus on the Western Cape

The report has been compiled by the GreenCape Waste Sector Desk. It highlights key insights and opportunities identified in the past year across the waste value chain (collection, sorting, processing and treatment) in a dynamic and evolving waste sector.

The section that follows provides an overview of the waste industry in South Africa, with particular focus on the Western Cape (Section 2). This is followed by an overview of policies and regulations that guide and affect the waste sector, as well as updates since the previous MIR (Section 3).

Key investment opportunities and barriers to these are highlighted, followed by emerging trends (Section 4). Section 5 outlines finance and incentives that may be relevant or of interest to investors.

The case for the Western Cape as a greentech hub for Africa is covered (Section 6), followed by an outline of GreenCape's work in supporting the growth of South Africa's green economy (Section 7).

For questions or queries, or to access GreenCape's services, contact the Waste Sector Desk at 021 811 0250 or via email at waste@greencape.co.za.

2 – Sector overview

This section provides a broad overview of the South African and Western Cape waste sectors.

It outlines the industry structure and key players, followed by overviews of the South African and Western Cape waste economy markets. The section also highlights key 2017 investments in and insights related to the Western Cape's waste economy.

Over the last five years, GreenCape has been producing an annual Waste Economy MIR. This period has seen growth in the uptake of alternative waste treatment (AWT) solutions and increased diversion of waste from landfill, both in the Western Cape and in South Africa. This has been the result of, among others:

- increasing **pressures on municipalities** (e.g. limited landfill airspace);
- **extensive investment** and activity by voluntary material organisations and producer responsibility organisations; and
- some **increase in awareness** of sustainability imperatives by business and industry.

Furthermore, the government is increasingly focusing on the waste economy as a job creator through various green economy policies and strategies. This has manifested in several key developments over the last year:

- **a Phakisa³** on the chemical and waste economy took place in July 2017;
- several **progressive legislative updates** (Section 3); and
- the call for submission of **industry waste management plans (IndWMPs)** for the paper and packaging, electrical and electronics, and lighting industries.

The number of AWT projects (implemented and planned) has increased. However, the actual impact of these has not yet been assessed. The national Department of Environmental Affairs (DEA) has established the South African Waste Information System (SAWIS) in accordance with Section 60 of the National Environment Management: Waste Act 59 of 2008 (NEMWA). The aim is to record, collect, manage and analyse data and information on waste flows. However, the DEA has noted that the information acquired to date is limited and not a clear representation of what is actually occurring. This is largely due to inadequate/ineffective reporting and the lack of enforcement of the SAWIS.

The National Waste Management Strategy (NWMS) came into effect in 2011, and the targets set therein are required to be monitored at least every five years (DEA 2012). In accordance with the NWMS action plan, a national baseline assessment was undertaken in 2012 (using 2011 as the baseline year). It estimated that South Africa produces 108 million tonnes of waste with a 10% diversion rate (DEA 2012). At the time of writing this report, the DEA has published a tender requesting an update to the national baseline study, which is expected to be concluded in 2018.

2.1. Industry structure

The waste economy in South Africa is structured into three broad sectors: **waste generators, waste collectors, and waste treatment**. The most common form of waste treatment has historically been landfilling, with AWT now becoming part of the 'treatment' sector.

Figure 1 illustrates the relationship between the three sectors. The figure also illustrates that the South African waste sector comprises four key types of stakeholders — public sector, private sector, households and associations. They all interact in some form or another, and their roles and responsibilities are governed by a well-defined legal framework.

		Collection	
		Local Municipalities	Private Sector
Generation	Household	Local municipalities are constitutionally mandated to ensure that household waste is collected. They can provide the service themselves or appoint private waste contractors.	Waste management companies can be contracted by local municipalities (through a procurement process) to collect household waste, or to manage drop-off facilities used by households.
	Commercial/Industrial	Local municipalities are not required to service commercial or industrial waste generators. However, commercial and industrial waste generators may request a municipality to collect their waste, but this incurs a service fee.	Commercial and industrial waste generators are responsible for managing their own waste, including safe disposal. However, this is usually outsourced to private waste management contractors.
Treatment/Disposal		Municipalities are mandated to ensure the availability of disposal facilities, such as landfills. They can also support AWT by means of providing material recovery / aggregation infrastructure. Such facilities are managed internally or contracted to the private sector through a procurement process.	The private sector can either have its own waste treatment and/or disposal facilities; or it can be contracted by local municipalities to manage municipal recovery / aggregation / disposal facilities.

Figure 1: Waste collection and treatment responsibilities in South Africa

Public sector

All spheres of government (local, district, provincial and national) are legally responsible for waste management, and for upholding the Constitution and the NEMWA. However, roles vary depending on department and sphere. Understanding these roles and responsibilities allows investors to assess the spheres on which to focus their energies when accessing opportunities.

The **national** DEA is the overarching authority for waste management in South Africa. The DEA, through its Waste Management Bureau, will most likely oversee the implementation of the IndWMPs (see Section 2.5.2). Its role will include supporting and advising industry on the development of the plans, monitoring implementation of plans, and managing disbursement of funds.

³ | Phakisa' means 'hurry up' in Sesotho. Operation Phakisa is an initiative by government to fast track the implementation of solutions on critical development issues under the National Development Plan.



The **provincial** government's Department of Environmental Affairs and Development Planning (DEA&DP) is the Western Cape's provincial waste authority. Its functions include promulgating provincial legislation, municipal support, and monitoring of municipal and private sector activities.

Waste generators and handlers triggering the thresholds stipulated in Annex 1 of the National Waste Information Regulations (59 of 2008) must register with and report waste figures to the national DEA via the South African Waste Information System (SAWIS)⁴. In the Western Cape, this reporting must be done through the provincial Integrated Pollutant and Waste Information System (IPWIS) managed by DEA&DP. Investors looking to develop waste activities / facilities that will require a waste management licence will have to apply with the DEA if hazardous waste is handled (see [Section 3.1](#)), and the DEA&DP for general waste (see [Section 3.1](#)). The DEA&DP has commenting authority for hazardous waste.

Local municipalities are constitutionally⁵ mandated to provide waste management services to households within their boundaries. These services include removal / collection, storage and disposal of waste generated by households. Collection can be done by the local authority or outsourced to the private sector. Local municipalities are not mandated to provide the commercial and industrial sectors with waste collection services.

Municipalities are also expected to provide waste collection and disposal infrastructure⁶. AWT is not explicitly required by the Municipal Systems Act (MSA) 32 of 2000; it is considered to be a municipal support activity in terms of the MSA (National Treasury 2008) and as such municipalities will need to motivate for the provision of services via a Section 78 process of the MSA. However, both the NEMWA⁷ and the NWMS require local municipalities to implement AWT mechanisms to divert waste from landfill and minimise environmental degradation. In some cases, municipalities provide infrastructure for aggregation (drop-offs) and separation (e.g. material recovery facilities), rather than providing the actual recycling infrastructure for conversion into a secondary material.

These facilities are operated either by the local municipality or can be outsourced to the private sector through a procurement process.

Private sector

The commercial and industrial sectors are responsible for managing their own waste. They are bound by legal and regulatory requirements, whether they are waste generators or waste handlers.

- **Waste generators** are solely responsible for the management, i.e. collection, storage and disposal, of their own commercial and industrial waste. The management of their waste is generally outsourced to private waste service providers, or alternatively done by local municipalities on request. Both these options will incur a service fee. In practice, municipalities do not involve themselves with hazardous waste.
- **Waste handlers** are responsible for providing waste management services to their clients, such as commercial and industrial entities, as well as households, if they are contracted by municipalities as service providers. These services range from advice, onsite waste coordination, storage, collection/transport, treatment, disposal and/or reporting. Waste handlers are required to adhere to both national and local waste regulations.

For investors, gaining access to waste streams is easier when working with the private sector and their service providers / waste handlers, compared to transacting with municipalities, mainly because investors and the private sector have fewer legal requirements with which to comply. (See 'How to work with municipalities' for additional legal obligations on municipalities regarding transactions with the private sector).

Private waste handlers typically allow easier access to waste streams than municipalities

⁴ A system used by government and industry to capture data on the tonnages of waste generated, recycled and disposed of in South Africa on a monthly and annual basis.
⁵ Schedule 5b of the Constitution of the Republic of South Africa (Act 108 of 1996), further entrenched by Sections 152.1b and d of the Constitution, assigns a variety of functions to the local government sphere.
⁶ The Western Cape has one landfill site, Vissershok, that is permitted to receive level 3 and level 4 waste. Level 1 and level 2 waste types are only permitted to be received by privately owned landfill operators.
⁷ NEMWA (Act 107 of 1998).

- In the Western Cape, the linear value chain, i.e. collection, aggregation and disposal, is dominated by several large **waste management companies**, namely Averda, Enviroserv, Interwaste, Waste-Mart and WasteControl. Averda and Enviroserv jointly own the only private landfill in Cape Town. There are five other landfills in the Western Cape owned by the private sector: Mossel Bay (Petro SA), De Hoek and Riebeeck West (PPC), Vredenburg (Exxaro) and Saldanha Bay (ArcelorMittal). However, waste management is not these companies' core business.

Households

Households are generally serviced by their local municipality, or the municipality's contracted collectors. Some municipalities require households to separate recyclables from non-recyclables, and to ensure that the recyclables are disposed of responsibly. This can be done by either contracting the municipality (at a service fee, unless the municipality has a recycling collection service), contracting an accredited waste service provider, or delivering recyclables to a licensed waste facility and drop-offs. Voluntarily contracting the private sector is becoming more common, especially in communities falling outside of municipal recyclable collection schemes.

Recycling industry associations

South African legislation has made provision for recycling to divert waste from landfill. Recycling activities in South Africa are largely driven by industry through the establishment of industry associations. There are various industry associations in South Africa, all contributing to promoting the recovery and recycling of materials at different points of the value chain.

There is no clear distinction between the roles, responsibilities and mission statements of the different industry associations.

However, there are specific industry associations for all mainstream recyclables⁸ (paper, glass, plastics and metal), electronic waste (e-waste) and recently, organics⁹, with these associations involved in diverting 'their' material from landfill. They provide varying levels of support to their members along the waste value chain (disposal, recovery and recycling).

The associations currently fall within the following categories:

- **Producer responsibility organisations (PRO):** generally non-profit organisations with a national footprint and primarily funded by producers (manufacturers / brand owners / converters / refurbishers) of a product.
- **Material specific organisations:** generally non-profit organisations with a national footprint and primarily funded by material producers.
- **Recycling organisations:** primarily funded by recycling companies for support in collecting

Currently, membership and financial contributions to the industry associations are voluntary. However, this will most likely change with the implementation of the envisioned IndWMPs (see [Section 3.2](#)). Two options have been discussed¹⁰.

Industry members along the value chain will either be legally required to register with a relevant PRO and subsequently pay levies, or registration will be required but levies will be voluntary. However, those industry stakeholders that do not pay levies

How to work with municipalities

The Municipal Systems Act 32 of 2000 governs municipalities when they improve, extend or upgrade a municipal service, or establish a new municipal service. For various reasons such as budgetary constraints, municipalities may require the assistance of the private sector to ensure that their service delivery needs are met. The necessary steps required before a municipality can partner with the private sector are outlined in Section 76 – Section 78 of the Act.

During this process a municipality will identify the type of contractual arrangement needed should it decide to partner with the private sector. Based on the need, a variety of contractual arrangements can be considered, of which the most common are (COGTA, 2004)¹¹:

- **Service contracts:** These are standard short-term contracts that usually run for no longer than three years. The municipality pays a service provider to manage / provide a particular aspect of a municipal service. This could be waste collection, providing vehicles, or designing and constructing infrastructure.
- **Management contracts:** These are medium-term contracts of between three and five years. The municipality will pay a service provider to manage an aspect of a municipal service. However, the municipality will still be responsible for financing the operations, maintenance, repair, or capital costs of the service. Such contracts are used when municipalities outsource the operation of their existing infrastructure, such as transfer stations or waste drop-offs.
- **Leases:** These are long-term contracts that can run from 8 to 15 years. In this case, the service provider pays to use the municipal assets to undertake the municipal service or support service. The service provider is responsible for operating, repairing, and maintaining those assets. The benefit for the private sector is the use of the infrastructure and any revenue generated from operating the service. For instance, these contracts would be used for operating material recovery facilities, where the service provider makes an income from the sale of recyclables.
- **Build, Operate, Transfer (BOT):** These contracts are in place for more than 15 years until a return on investment is achieved. The service provider accepts most of the risk in this contract, taking responsibility and paying for nearly all aspects of delivering the municipal service, i.e. construction, operation and maintenance. At times design is also included. At the end of the contract, once the service provider has obtained a return on the investment, the facility is transferred to the municipality.

This kind of contract is beneficial to the private sector as it allows investors to generate revenue from providing a municipal service, whilst the municipality will gain new infrastructure. An example of such a contract could be a composting facility where a service provider treats the organic fraction of municipal solid waste (MSW) and benefits from the sale of the compost that it produces from the waste. The advantage for the municipality is that they tap into the private sector for both expertise and funding that would otherwise not be accessible to the municipality.

- **Concessions:** Much like the BOT, the service provider is responsible for all aspects of the municipal service,
- but it includes recovery of service costs / service tariff collection. The service provider generally pays the municipality a concession fee for the rights to operate the municipal function. At the end of the contract any new infrastructure is transferred to the municipality. The municipality would normally engage the private sector via a tender process when seeking to partner. However, at times these engagements can be instigated by the private sector via an unsolicited bid. An unsolicited bid is an offer submitted by any entity at its own initiative without having been invited by a municipality to do so. It should be noted that according to Section 113 of the Municipal Finance Management Act (MFMA) 56 of 2003 the municipality is not obliged to consider an unsolicited bid received outside normal bidding processes. However, if a municipality should consider such a bid, it may do so only in accordance with a prescribed framework, such as a supply chain management policy that includes public participation. Such a supply chain management policy must be drafted in line with the National Treasury's Municipal Supply Chain Management Regulation of 2005.

⁸ Management Bureau until a new IndWMP has been finalised and a PRO has been confirmed.

⁹ An industry association focused on the management of organic waste has been registered as the Organic Recyclers Association of South Africa (ORASA).

¹⁰ As voiced by DEA at the Industry Waste Management Forum hosted by DEA&DP on 06 September 2017.

¹¹ This is a generic list – contract durations and agreement conditions may well change based on requirements. For example, service contracts may run beyond three years if required. As of 2017, REDISA has been liquidated and has fallen away as the tyre PRO.

2.2. South African market size

In the absence of a mature South African Waste Information System¹², and poor standard data collection and reporting, it is difficult to present a true picture of the size of the South African waste sector. The 2011 National Waste Information Baseline (NWIB) is the most current official source of information used by national decision makers when presenting the state of waste and developing plans and policies.

According to this NWIB, in 2011 South Africa generated approximately 59 million tonnes of general waste, 48 million tonnes of unclassified waste, and 1 million tonnes of hazardous waste¹³. This equates to a total of 108 million tonnes in 2011 (DEA 2012). Figure 2 illustrates this breakdown as a percentage of total waste.

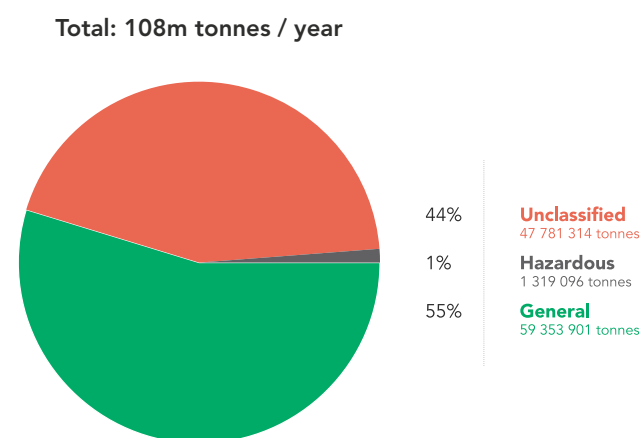


Figure 2: Classification of total waste generated in South Africa in 2011

Source: DEA (2012)

The 'business as usual' approach to waste management is focused on landfilling. This is illustrated by the estimated 90% of waste being landfilled¹⁴. In 2014, the formal waste sector was estimated to be worth at least R15.3 billion in revenue (DST 2014). The same sector employed close to 30 000 people, primarily in the recycling / reclamation sector, and supported between 60 000 and 90 000 livelihoods in the informal sector (DST 2014). Capital investment from the public sector has been and remains primarily in collection infrastructure (transport), aggregation, and landfilling. At the time, the private sector invested considerably in material recovery, AWT and landfilling (DST 2014).

The 2012 NWIB estimated that only 10% of waste was recycled. However, it is estimated that 65% of the waste (approximately 38 million tonnes) is recyclable and could subsequently be diverted from landfill and recovered to be reprocessed / repurposed (DEA 2012). Based on global trends, by diverting waste from landfill South Africa could increase the revenue from this sector. In 2014, the DST's Waste Research, Development and Innovation (RDI) Roadmap estimated that an additional R17 billion per year worth of resources could be unlocked if 100% of the identified 13 waste streams¹⁵ could be beneficiated. However, achieving the goal of the Roadmap by 2022 (Scenario 3¹⁶) would unlock R9.2 billion resource value to the economy.

The DEA presented extrapolated waste figures for 2016 as part of the Operation Phakisa for chemicals and waste economy (Section 2.5.1). The estimates indicated that waste generation had increased by 3 million tonnes to 111 million tonnes since 2011. The waste economy contributed R24.3 billion to the South African GDP, provided 36 000 formal jobs and supported an estimated 80 000 informal jobs/livelihoods.

The South African government has recognised the role that waste can play in creating jobs and socio-economic opportunities, and in moving South Africa towards a more resource efficient economy. This is evident in a number of initiatives and legislative reforms that have been proposed by government to boost growth in this sector. However, more accurate and updated waste figures will help policy makers to make informed decisions, and assist the private sector to assess the benefits and risks of investing in the sector.

2.2.1. Cost of landfilling in South Africa

The cost of landfill disposal (gate fee charged per tonne) is relatively low in South Africa compared to benchmarks in the EU and other developed economies. However, disposal costs are still regarded as a costly overhead for many waste generators. Figure 3 provides the landfill gate fees for general waste in the eight metropolitan municipalities in South Africa for 2017/2018, gathered via GreenCape engagements with the respective municipalities. The large cost variance, although not in all cases, can be attributed to limited management of the landfill resulting in (artificially) deflated operational costs, and / or not doing full cost accounting. Consequently, gate fees are not fully reflective of the true cost of disposal.

¹² The national repository for waste information is currently available and is capturing data on a national scale.

¹³ Waste streams were grouped under 'unclassified' because it was impossible to distinguish between general and hazardous wastes due to companies using an older categorisation system.

¹⁴ The national repository for waste information is currently available and is capturing data on a national scale.

¹⁵ Waste streams were grouped under 'unclassified' because it was impossible to distinguish between general and hazardous wastes due to companies using an older categorisation system.

¹⁶ This does not take into account leakage, e.g. materials that enter oceans or are exported and are effectively 'lost' from the accounting system.

¹⁷ Municipal waste (non-recyclable portion); organic component of municipal waste; biomass waste from industry; construction and demolition waste; paper; plastic; glass; metal; tyres; e-waste; slag; ash; and waste oils.

¹⁸ Achieving: 20% reduction in industrial waste and a 60% reduction in domestic waste

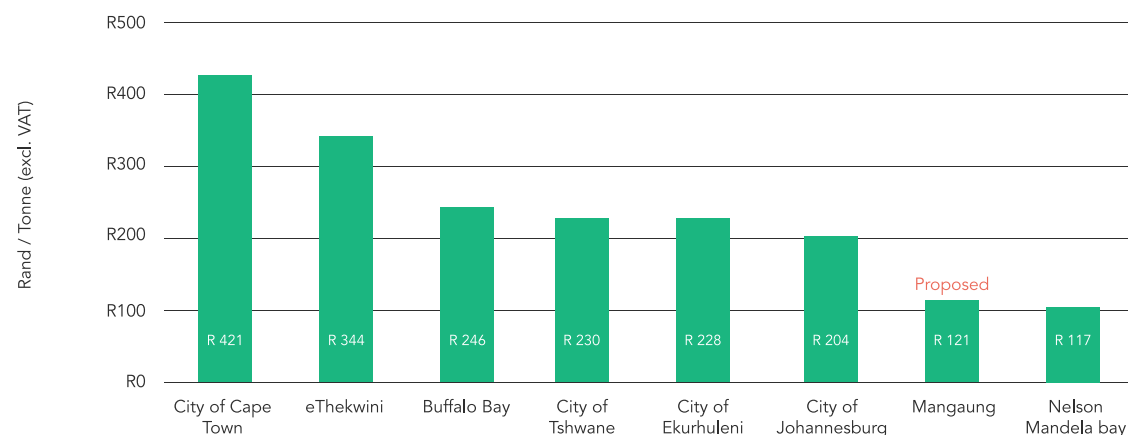


Figure 3: Municipal landfill gate fees for general waste for eight metros in South Africa 2017/2018

Source: GreenCape

2.3. Western Cape market size

As is the case in other provinces, one key driver for the increase in waste generation in the Western Cape is population growth. The population of the Western Cape has grown substantially over recent decades and is expected to grow by an average of 1.1% per year up to 2040 (WCG 2016). Table 1 illustrates this growth since 2001 and provides a projected population size for 2040.

The Western Cape generated an estimated 7.7 million tonnes of waste in 2016. Figure 4 and Table 2 show the tonnages generated in the Western Cape (DEDAT 2016). Annex A provides a more detailed waste distribution by municipality. In 2012, compared to the other provinces of South Africa, the Western Cape had the second highest per capita MSW generated per year (675kg). Gauteng was the highest at 761 kg, and the lowest was Limpopo at 103 kg (DEA 2012).

Table 1: Estimated population growth for the Western Cape

Year	2001	2011	2016	2040 ¹⁷
Population Size	4.5 m	5.8 m	6.3 m	8.1 m
Growth %	-	28%	9%	29%
Source	Strats SA 2011	Strats SA 2016	Strats SA 2016	Strats SA 2016

¹⁷ As per Base Case scenario, reported in the Futures Cape Policy Research Paper (WCG 2016), which assumes no major policy changes / significant disruptions to current trends.

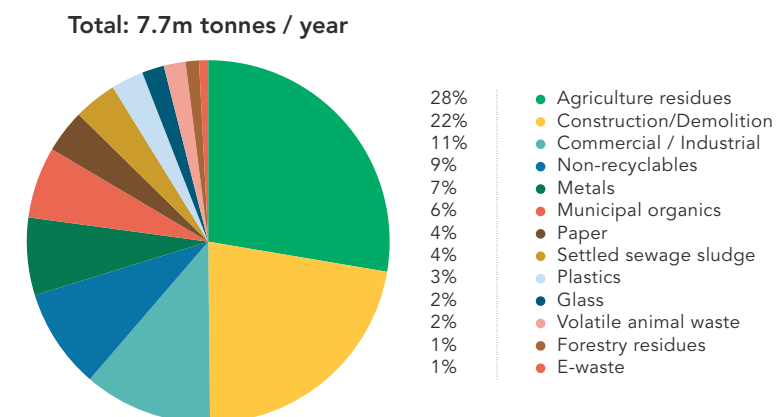


Figure 4: Western Cape total waste characterisation – waste streams and proportions

Source: DEDAT 2016¹⁸

Table 2: Total waste tonnages generated per district municipality / metro for 2016

Source: DEDAT (2016), Stats SA 2016 Community Survey

Municipality	Tonnages ¹⁹			Population ²⁰	Tonnages of Municipal Solid Waste per person per annum
	Municipal Solid Waste	Commercial/ Industrial	Total		
City of Cape Town	2 762 100	951 600	3 713 700	4 004 793	0.7
Cape Winelands	559 200	453 300	1 012 500	866 223	0.6
Eden	332 500	606 100	938 600	611 278	0.5
West Coast	204 700	938 600	1 185 500	436 403	0.5
Overberg	180 700	587 300	768 000	286 786	0.6
Central Karoo	40 900	43 080	83 980	74 247	0.6
Total	4 080 100	3 622 180		6 279 730	0.6

The CoCT is the central hub for commerce and industry in the province and provides more than 72% of its GDP (Quantec 2017). However, the city only generates a share of 26% (951 600 tonnes) of the total commercial and industrial waste, i.e. non-household waste.

This is because primary agriculture is located outside the CoCT and agricultural residues account for 28% (2 million tonnes) of the overall waste generated in the Western Cape²¹.

¹⁸ Western Cape Department of Economic Development and Tourism.

¹⁹ Figures taken from DEDAT 2016.

²⁰ Based on StatsSA's 2016 Community Survey.

²¹ These figures do not necessarily mean that the wastes are landfilled or available for processing – some, such as certain agricultural residues, are often used on the farm for soil fortification or animal rearing.

2.3.1. Cost of landfilling in Cape Town

Landfill costs increase annually due to the rising operating costs (logistics, labour and infrastructure) of providing municipal waste services, together with compliance costs associated with national legislation. The CoCT has the highest landfill gate fees in South Africa. This is expected to remain the case in the future with one of the three landfills (Bellville South) expecting to close in 2018. Figure 5 illustrates the rise in gate fees over the last five years, and provides a conservative projection for the next three years. The projections are based on the inflation rate, and the highest and lowest gate fee increases recorded over the last five years.

Landfill closures

In September 2018 one of CoCT's three landfills, Bellville South, will be closing permanently. However, the material recovery facility and refuse transfer station situated nearby will continue as usual.

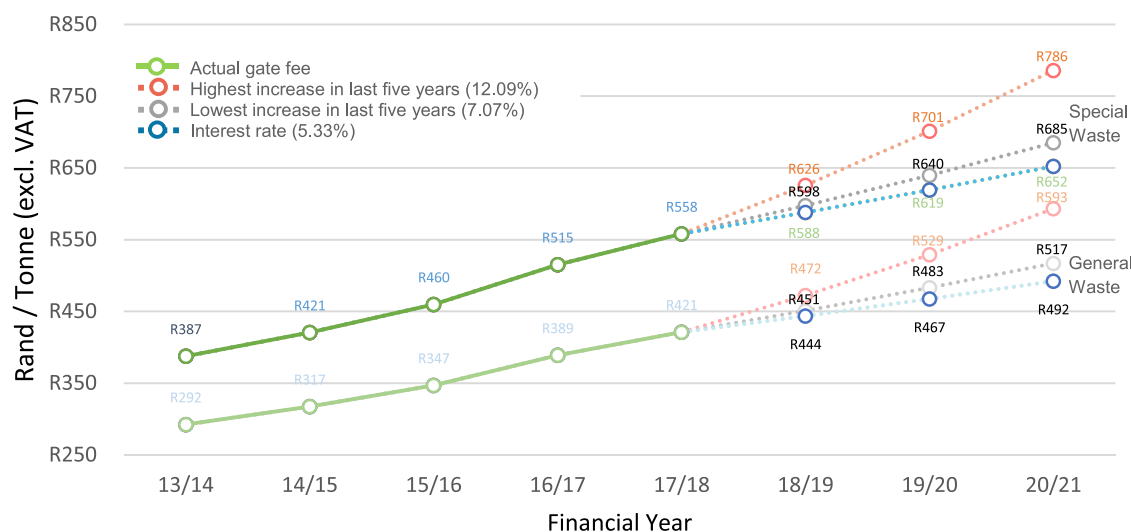


Figure 5: General and hazardous waste gate fees for the City of Cape Town (2007-2021)

Source: GreenCape, based on CoCT gatefees since 2013

2.4. Market size according to recycling industry associations

Table 4 lists active industry associations and their stream-specific estimates of tonnages generated and diverted for South Africa. The table also provides two estimated tonnage figures available in the Western Cape. One is based on the proportion of the population compared to other provinces, and the other is based on the nominal output compared to other provinces. (DEA 2012).

2.5. Key highlights in 2017/2018

Investors should take note of the other important developments below.

2.5.1. Operation Phakisa

The DEA hosted a five-week chemical and waste economy Phakisa between July and August 2017 to discuss the state of waste in the country and to identify key work areas. The participation by business, government and civil society identified 20 key initiatives across four work streams. Table 5 provides a description of each of the 20 initiatives, coupled with estimates of the projects' job creation, coupled with estimates of the projects' job creation, GDP contribution and waste diversion potential.

Collectively, additional outcomes of the initiatives include:

- **Landfill diversion:** 20 million tonnes per year (75% industrial and 50% municipal)
- **Jobs created:** 127 000 (45 000 direct and 82 000 indirect)
- **GDP contribution:** addition R11.5 billion per year
- **SMMEs created:** 4 300

To implement all the initiatives, R9.1 billion of investment over the next five years is required. Of this, it is expected that R7.3 billion can be attracted from private sources, while the remaining R1.8 billion will be used to provide critical infrastructure and awareness campaigns. This will have to be financed from public funds.

Government regards Operation Phakisa as a positive step to support the beneficiation of waste, and the diversion of waste from landfill. However, to achieve the goals of Phakisa a substantial amount of work and continued collaboration between government (national, provincial and local) and the private sector are needed.

Current legislation (MSA, MFMA) does not require municipalities to divert waste from landfill, thus budgeting to implement the municipal focused intervention will be a challenge. The DEA will need to provide guidance to municipalities on new municipal waste management rules and regulations, on how to access funding for projects, and on appropriate cost structures that take into account diversion from landfill, in order to safeguard revenue generation. This support is required, given that many municipalities still struggle to provide basic services.

2.5.2. Industry waste management plans

An initial NEMWA Section 28 notice to the paper and packaging, electrical and electronics, and lighting industries to prepare and submit IndWMPs for approval in 2016, was retracted as a result of industry feedback. A new notice was published on 06 December 2017 (GN 1353 of 2017) requiring the said industries to prepare and submit IndWMPs to the Minister for approval within by 06 September 2018. IndWMPs are a key milestone towards ensuring that producers in the respective industries practise extended producer responsibility.

The IndWMPs are intended to:

- reduce pollution and ecological degradation;
- incorporate the informal sector into the waste management;
- unlock funds to support the waste sector;
- create employment; and
- bring about transformation.

Please see Section 3.2 for more information on what is required of producers.

Table 3: Industry association and recyclables processed / available – 2016

Name of the industry association		Industry Association	Material in circulation (imported/ manufactured)	Collected/ diverted from landfill		Tonnes available for recycling		
				Tonnes	%	SA	WC	
							Population-based asset est.	National Out-put-based est.
Plastics	PET Beverage bottles	PET (PET Recycling Company)	164 063	90 749	55%	73 314	8 252	10 244
	PET Thermoform	No formal industry association	77 206 ²²	0	0%	77 206	8 690	10 788
	PE-LD	POLYCO (Polyfoein Recycling Company)	277 008	100 000	36%	177 008	19 924	24 733
	PE-DH		171 554	58 500	34%	113 054	12 726	15 797
	PP		90 308	20 500	23%	69 808	7 858	9 754
	PVC	SAVA (South African Vinyl Association)	Unknown					
	PS	PASA (Polystyrene Association of SA)	67 712	5 261	8%	62 451	7 030	8 726
Paper		PRASA (Paper recycling Association of SA)	2 046 784	1 400 000	68%	646 784	72 803	90 373
Glass		TGRC (The glass recycling company)	3 183 908	2 770 000	87%	413 908	46 590	57 834
Metal*	Other	SAEWA (South African E-waste Alliance)	3 121 000	2 497 000	80%	624 000	70 238	87 189
	Aluminium	Collect-A-Can						
E-waste*		SAEWA (South African E-waste Alliance)	322 000	38 000	12%	284 000	31 968	39 682
		EWASA (E-waste association of SA)						
Organic Recyclers		ORASA (Organic Recycling Association of SA)	Not Applicable					
Tyres		No industry association ²³	270 000	189 000	70%	81 000	9 117	11 318

Sources: Most recent industry association annual reports and direct engagements during 2017

²² Information provided by PETCO, which is actively seeking solutions for the material.
* Based on 2017 MIR figures
²³ In October 2017, the Minister of Environmental Affairs withdrew the IndWMP of the Recycling and Economic Development Initiative of South Africa (REDISA). In the meantime, the Waste Management Bureau will manage waste tyres until a new plan has been put in place. The Minister has since released a call call for new plans. The figures provided are therefore based on the 2017 MIR.

Table 4: Description of the 20 Phakisa initiatives and their potential impacts

Theme		Initiative		Jobs Created (est)	GDP contribution (est)	Annual waste diverted (est tonnes)
Bulk industrial waste	Ash, slag and gypsum	1	Increase ash uptake for alternate building materials	24 500	R7.4 billion	10 300 000
		2	Accelerate innovation and commercialise existing R&D	1 000		500 000
		3	Export ash and ash products	1 000		4 000 000
	Biomass waste	4	Zero sewage sludge to land	29		100 000
		5	Towards zero meat production waste to land(fill) by 2023	890		800 000
Municipal	E-waste	6	ntroduction of an e-waste levy to increase collection rate	15 100 (Direct) 21 000 (Indirect)	R2.1 billion	3 700 000
		7	Unlocking government ICT legacy volumes			
	Organic	8	Achieving minimum of 50% of households separating at source by 2023			
	Packaging	9	Introduction of MRFs and pelletising plants to increase recycling rates			
	Construction and demolition	10	Produce building aggregates and construction inputs from rubble and glass			
Product design and waste minimisation	Food	11	Developing capacity through a specialised programme which upskills agri-stakeholders to minimise food loss	287	R1.2 billion (loss avoided)	245 000
		12	Consumer awareness campaign to use and consume ugly food			
	Packaging	13	Compilation/update of packaging design guidelines	2 464	R36 million	146 000
		14	Formalising the packaging industry producer responsibility plans			
	Refuse Derived Fuel	15	Establish refuse derived fuel plants across South Africa	305	R80 million	120 000
Chemicals	Harmful Chemicals Imports	16	Establish a refrigerant reclamation and reusable cylinder industry	~2 000 (Direct) ~1 000 (Indirect)	R540 million	225 000 cylinders
		17	Ban import of harmful chemicals, eg. leaded pain/pain pigments			
	Dangerous chemical stockpiles	18	collect and dispose stockpiles of harmful substances (esbestos, mercury)	NA	NA	NA
SMME development		19	Coordinate SMME development opportunities across initiatives			
Awareness		20	Roll out national awareness campaigns			

2.5.3. Renewable energy Independent Power Producers Procurement Programme (REIPPPP)

Utility scale electricity generation from landfill gas and anaerobic digestion has been included in the Renewable Energy Independent Power Producers Procurement Programme (REIPPPP).

Pushback from Eskom²⁴ on the sustainability of subsidised energy procurement through the REIPPPP has shifted the focus to cost-competitive technologies. The base case for the latest draft of the Integrated Resource Plan (IRP) (2010-30) includes 260MW of landfill gas over 2025-2027 as the biogas technology to be implemented. However, the recent introduction of a price cap by the DoE on projects for Rounds 4 and 4b makes difficult for waste-to-energy to be competitive. At the time of writing, it is unclear if this price cap will remain across all technologies going forward or if the IRP 2016 will be inclusive of less competitive technologies.

2.5.4. National Minimum Wage Bill

It is expected that the National Minimum Wage Bill (B 31-2017) will be passed by Parliament in May 2018²⁵. The Bill introduces a blanket minimum payment structure for every South African in employment, including those in the waste sector. The proposed minimum wage is to be R20/hour or R3 500 per month for a 40-hour week, subject to an annual review. The waste sector in South Africa is labour intensive and such minimum requirements are expected to impact on the viability of many businesses, especially SMMEs. What this means for the Operation Phakisa job creation targets is unknown.

²⁴ | South Africa's state-owned power provider, established in 1923 as the Electricity Supply Commission.

²⁵ | Copy of the bill can be found at www.gov.za/sites/default/files/171124B31-2017_National_Minimum_Wage_a.pdf



3 – Legislation and regulations

This section provides a brief introduction to the legislative and regulatory framework governing waste management in South Africa and the Western Cape. It outlines updates made in the past year to specific legislation, landfill bans / restrictions promulgated and draft legislation that may affect the waste economy, if applied.

3.1. The legislative framework for waste management in South Africa

In terms of Chapter 2 (Bill of Rights) of the South African Constitution, everyone has the right 'to an environment that is not harmful to their health or wellbeing; and to have the environment protected, for the benefit of present and future generations'. These fundamental rights underpin the framework that governs environmental legislation in South Africa, i.e. the National Environmental Management Act (NEMA).

The National Environmental Management Act (Act No. 107 of 1998)

NEMA is guided by a number of integrated environmental management principles. These principles aim to ensure negative environmental impacts are prevented, mitigated, and regulated. They also provide an array of instruments to monitor and manage activities that have an impact on the environment. One such mechanism is the environmental impact assessment (EIA) regulations.

The EIA regulations list a number of activities that may result in substantial negative impacts on the environment. These 'Listed Activities' require either a 'Basic Assessment' process or a 'Scoping/EIA' process to be authorised before an activity can be undertaken. Commencement with any of the 'Listed Activities' prior to obtaining authorisation from competent authorities is prohibited in terms of NEMA and is regarded as an offence. The EIA process

requires a third party environmental assessment practitioner (EAP) to undertake the application. The EIA regulations do not just apply to general activities, but include additional waste activities governed by National Environmental Management Waste Act (NEMWA) (Act No. 59 of 2008), or more colloquially 'the Waste Act'.

National Environmental Management Waste Act (Act No. 59 of 2008)

NEMWA is a waste specific act that is guided by integrated waste management principles aimed at preventing negative waste-related environmental impacts. Since its promulgation in 2008, all spheres of government are bound to the ideals of the waste management hierarchy:

- Avoid and minimise the generation of waste;
- reduce, reuse, recycle and recover waste; and
- treat and safely dispose of waste as a last resort.

NEMWA provides a list²⁶ of certain waste management activities²⁷ that must undergo a waste management licensing process²⁸. These activities have, or are likely to have, a detrimental effect on the environment.

Waste management activities are differentiated into three categories that have different approval / licensing requirements. 'Category A' activities require a basic EIA; 'Category B' require a Scoping and Full EIA process to be undertaken prior to obtaining a waste management licence; and 'Category C' activities require adherence to specific norms and standards.

There are concerns that the licensing process is overregulated²⁹, which is hampering growth in the waste sector. Based on engagements with GreenCape's members, it has become evident that SMMEs find regulation a hindrance to their expansion, primarily due to the cost of the licensing process. This is more often the case when the SMMEs do not own, but rather lease, the property for which the licence is needed.

Municipal waste management by-laws

Local municipalities may choose to regulate how waste is managed within their boundaries by passing a by-law focused on waste management.

These by-laws often provide obligations for both waste generators and waste handlers. The CoCT's by-law³⁰, for example, requires that any (juristic) person intending to perform recycling, reuse or recovery activities, or the sorting of waste, must register for accreditation with CoCT before commencing such activities. To be accredited, the person must also submit an integrated waste management plan to a CoCT waste management officer. Similar by-laws may apply in other municipalities. Existing businesses not yet registered with their respective municipalities, or investors looking to enter the market, must ensure that they engage with the respective solid waste departments of the municipalities where they conduct or plan to conduct their activities.

GreenCape's engagement with its members suggests that SMMEs in particular find it cumbersome to navigate the wide range of legal and regulatory requirements. A number of proposed changes in legislation may assist to alleviate this challenge.

Furthermore, new entrants to the waste sector may often be unaware of the requirements, causing many SMMEs to operate outside the legal framework.

3.2. New regulatory updates

A number of legislative changes have occurred since the publication of the 2017 MIR. The following changes are likely to impact on specific waste activities, and the waste sector as a whole:

- Landfill bans and restrictions
- Declaration of greenhouse gases (GHGs) as Priority Air Pollutants
- National Greenhouse Gas Emission Reporting Regulations
- National Norms and Standards for Sorting, Shredding, Grinding, Crushing, Screening, or Bailing of General Waste
- Industry Waste Management Plans

Landfill bans and restrictions

The National Norms and Standard for the Disposal of Waste to Landfill Regulations (R636 of 2013) provide directives for the disposal of waste to landfill. Included in these norms and standards is a list of wastes that can and cannot be disposed of at landfill. Since its promulgation in 2017, the following wastes have been banned landfill:

- **Waste pesticides** (other than persistent organic pollutant pesticides listed under the Stockholm Convention);
- Re-usable, recoverable or recyclable used **lubricating mineral oils**, as well as oil filters, but excluding other oil containing wastes; and
- **Hazardous waste** with a calorific value of > 25 MJ/kg.

²⁶ GN 921 of 2013, as amended by GN R633 of 2015.

²⁷ Storage, recycling or recovery, treatment, disposal.

²⁸ The DEA&DP has developed a waste management licensing guideline.

²⁹ Numerous licensing requirements – different legislation, different governmental departments and different levels of government

³⁰ <https://openbylaws.org.za/za-cpt/act/by-law/2009/integrated-waste-management/#section-10>

Declaration of Greenhouse Gases as Priority Air Pollutants (GN 710 of 2017)

A number of greenhouse gases have been declared as Priority Air Pollutants under the National Environmental Management Air Quality Act (NEMAQA) (Act 39 of 2004). Carbon dioxide and methane are included in the list of priority air pollutants. The declaration requires (juristic) persons performing greenhouse gas emitting activities to submit a pollution prevention plan to the national Minister of Environmental Affairs for approval. These are persons conducting specific listed activities (and/or activities directed by the Minister) that emit more than 0.1 mega tonnes annually of priority greenhouse gases³¹.

Also published in terms of the NEMAQA, are the National Pollution Prevention Plans Regulations (GN 712 of 2017), which came into effect in July 2017. The Regulations prescribe the contents and compliance requirements of the pollution prevention plans. These requirements will impact on waste processing activities that are producing carbon dioxide and/or methane. Such processing activities would include production and/or processing of carbon black production.

National Greenhouse Gas Emission Reporting Regulations (GN 275 of 2017)

The National Greenhouse Gas Reporting Regulations of 2016 were published in April 2017, also under NEMAQA. The regulations provide a national reporting system for transparent reporting of GHG emissions. Persons in control of or conducting, among others, waste disposal site management, biological treatment of solid waste, incineration and open burning of waste, and/or wastewater treatment and discharge, will be required to adhere to these regulations. They will have to register with the National Atmospheric Emissions Inventory System (NAEIS)³², or with the competent authority where activities at their facilities exceed the listed thresholds. Registration had to be done by 7 May 2017 or within 30 days of starting such an activity, if at a later stage.

³¹ | Reported as carbon dioxide equivalents.

³² | NAEIS is an online national reporting platform for air pollutants and greenhouse emissions inventories of South Africa.

National Norms and Standards for Sorting, Shredding, Grinding, Crushing, Screening or Baling of General Waste (GN 1093 of 2017)

The new norms and standards published under NEMA (Government Gazette of 11 October 2017) lay down the requirements for waste facilities that sort, shred, grind, crush, screen, chip or bale general waste.

- **Facilities of over 1 000 m²** are required to register with the competent authorities and are also subject to mandatory monitoring, auditing and reporting requirements.
- **Waste facilities of less than 1 000 m²** will only be required to register with the competent authority and to comply with the prescribed environmental duties of care.
- **New facilities** must register within 90 days before any construction takes place.

The amendments reduce the requirements for certain waste management activities that would otherwise have required waste management licences. This will reduce the costs and delays (8 to 16 months to comply with regulations) for the general waste sector.

Industry Waste Management Plans (GN 1353 of 2017)

The NEMWA's Section 28 notice to the paper and packaging, electrical and electronics, and lighting industries to prepare and submit IndWMPs for approval was published on 6 December 2017.

The notice requires that all existing producers engaging with the aforementioned materials must register with the Minister of Environmental Affairs by 6 February 2018.

According to the notice, a "producer" includes any person, or category of person, or a brand owner who is engaged in the commercial conversion or refurbishment of new and/or used:

- **paper and packaging** material,
- **lighting** equipment,
- **electrical and electronic** equipment's, or
- goods wrapped in primary or secondary **packing** material.

Producers are either required to prepare and submit an IndWMP to the Minister for approval by 6 September 2018 or be part of / subscribe to a non-profit PRO which will develop and implement an IndWMP. Once the IndWMP has been approved by the Minister, producers must comply with the requirements of the IndWMP to which they have subscribed.

The entity intending to submit an IndWMP to the Minister must ensure the plan goes through a consultation process with relevant organs of state, interested and affected parties, and the public, before the final plan is submitted to the Minister for consideration. The entity/PRO must consider all representations and objections before submitting the IndWMP to the Minister.

Waste Tyre Regulations (GN 1064 of 2017)

These regulations repeal the Waste Tyre Regulations of 2009. These new regulations provide:

- updated **definitions**;
- **additional prohibitions** relating to the recovery of any financial gain in terms of a waste tyre management plan and the exportation of waste tyres;
- **registration requirements** for specific stakeholders to register with the Waste Management Bureau;
- **duties** of tyre dealers;
- **submission and content requirements** for waste tyre stockpile abatement plans; and requirements for the storage of waste tyres.

3.3. Draft regulations

Draft Regulations to Exclude Waste Streams from the Definition of Waste (GN 14 of 2018)

A revised draft of the Regulations to Exclude Waste Streams from the Definition of Waste in terms of the NEMWA, was published on 12 January 2018. The draft prescribes the manner in which an "Exclusion Application" may be made of certain waste streams from the definition of waste under NEMWA. The draft regulation also proposes the following wastes to be excluded from the definition of waste as long as they are used in specific applications.

These wastes include:

- **Waste slag** from metallurgical processes;
- **Ash** from combustion and gasification processes;
- **Gypsum** from pulp, paper, and cardboard production and processing; and combustion and gasification processes used as a soil conditioner or inert products; and
- **Biomass** of plant, animal or microorganisms origin³³.

³³ | Excludes sewage, sewage sludge, and treated or coated wood waste containing halogenated organic compounds or heavy metals.

3.4. Anticipated legislation

Scheduled national landfill bans

In terms of the National Norms and Standard for the Disposal of Waste to Landfill, the following materials will be banned from landfills from 23 August 2018:

- Reusable, recoverable or recyclable **used or spent solvents;**
- **Polychlorinated biphenyl** (PCB) containing wastes (>50 mg/kg or 50 ppm); and
- Waste **tyres** (quartered).

Provincial landfill diversion targets for organics

The DEA&DP has implemented an organic waste diversion plan, which aims to divert 50% of organic waste from landfill by 2022, and 100% by 2027. To this end, DEA&DP has implemented a waste management licence variation process for landfills to align with national and provincial waste diversion targets for operating waste disposal facilities. The waste management licence variation includes adding, substituting, removing or changing a condition or requirement of an existing waste management licence.

The diversion plan will require municipalities to set annual targets and identify procedures to meet those targets. Greater diversion of organics away from landfill will increase the lifespan of existing waste disposal facilities.

This will benefit local municipalities, as stricter national landfill design requirements have drastically increased the cost of landfill expansion.

Development of norms and standards for the treatment of organic waste in South Africa

GLZ, the German Society for International Cooperation, has appointed the environmental consultants, Cape EAPrac, to develop a motivation for the development of Norms and Standards for the treatment of organic waste in South Africa. The motivation will provide information to the DEA to consider implementing norms and standards for the treatment of organic waste. It is hoped that this will result in a favourable legal framework that reduces the regulatory procedures for treatment of organic waste.



4 – Opportunities

There are opportunities for investors in organics, e-waste, plastics, and builders' rubble, as well as broader opportunities for the waste economy. Specific opportunities for investors have also been identified through GreenCape's industrial symbiosis work.

The waste sector is broad and complex, consisting of various waste streams, stakeholders and technologies. This provides a variety of opportunities discussed in this section:

- **Organics:** Solutions are needed for municipal green waste, abattoir waste, the organic fraction of municipal solid waste; there is also biogas investment potential of R100 million.
- **E-waste:** The promulgation of an e-waste IndWMP, coupled with a national focus on legacy electronics, signal a rise in the availability of e-waste. This provides an increase in feedstocks for dismantlers and refurbishers, and an opportunity to establish the Western Cape's first licensed processing facility for processing large volumes of e-waste.
- **Plastic:** The promulgation of the paper and packaging IndWMP will unlock greater volumes of clean feedstocks and more business support for the sector, with further support likely through Operation Phakisa. There is a need for thermal treatment technologies for dirty mixed plastics, refuse derived fuels (RDF) and thermoform PET.
- **Builders' rubble:** The supply of and demand for builders' rubble as an alternative to virgin material are growing. National government and local municipalities are focusing increasingly on diverting rubble from landfill. The private sector is starting to consider builders' rubble as an alternative, in the context of rising virgin material costs. Crushing contracts in Stellenbosch and CoCT, green procurement by the private sector, and red tape reduction are further unlocking reuse potential of builders' rubble.
- **Municipal contracts:** A number of municipalities will need waste related infrastructure development / expansion / maintenance over the next three years. They include CoCT, Eden District, Drakenstein, Knysna, Langeberg, Saldanha, and Stellenbosch municipalities.
- **Opportunities identified through industrial symbiosis,** include the need for solutions for slag (540 000 tonnes/year), paper/pulp effluent (240 000 tonnes/year), foundry sand (74 000 tonnes/year), treated wood (760 000 tonnes/year), laminate glass (200 tonnes/year) and cardboard cores (170 tonnes/year).

Cheaper renewable energy for the waste sector

The business case for purchasing energy from energy service companies is becoming more favourable, particularly in solar photovoltaic (PV). This is the result of progressive bank financing, and because energy can be produced through a power purchase agreement (PPA) with an energy service company, without the user having to own the system. Businesses also have the option of producing electricity through a 'lease-to-own' route which allows them to pay off systems over 10 to 15 years. This presents attractive opportunities for waste management stakeholders looking to reduce energy overheads.

4.1. Organics

Figure 6 shows the total amount and sources of organic waste, i.e. wastes of biological origin, in the Western Cape in relation to other waste streams (grey shade). This section will focus primarily on organic material that is likely to enter landfills. It includes organics from the food and biomass value chain, and excludes forestry and agricultural residues³⁴.

There are growing opportunities for businesses and investors in alternative waste treatment (AWT) of organic waste in South Africa, and particularly the Western Cape. These include:

Growing competition within the waste sector is turning organics from a waste into a highly sought-after commodity.

Organics 3.1m tonnes / year

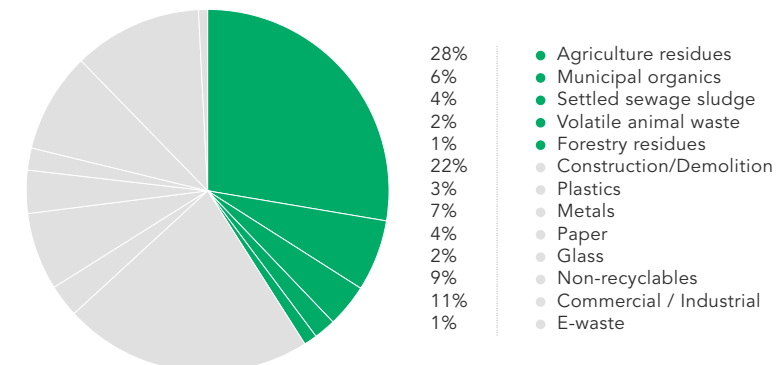


Figure 6: Proportion of organic waste relative to total waste generated in the Western Cape

Source: DEDAT (2016)

³⁴ | For insights into opportunities in agricultural residues visit the Bioeconomy Programme webpage: <https://www.greencape.co.za/content/sector/bioeconomy>

- **Municipal green waste:** Most local municipalities are not diverting green waste from landfill.
- **Abattoir waste** (particularly small-scale decentralised solutions): 81 abattoirs produce 15 395 tonnes per annum.
- **Municipal solid waste:** Over 200 000 tonnes per annum of the organic fraction of MSW are available.
- **Mixed organic waste**, primarily from commercial and industrial sectors.
- **Medium scale biogas facilities** are viable: biogas facilities of between 50 kWe and 1 MW can be financially viable when waste management costs are high.

Key drivers of these opportunities include:

- The current landfill ban on abattoir waste (Section 3.2).
- Future landfill restrictions on all organics (Section 3.4).
- Rising landfill gate fees (Section 2.3).
- Corporate sustainability obligations and targets.

4.1.1. Market size

The CSIR estimated³⁵ that in 2012 South Africa generated 12.6 million tonnes of organic waste, of which 10.2 million tonnes were edible food (Oelofse and Nahman 2013), and 2.4 million tonnes were inedible (de Lange and Nahman 2015). How much of this can be truly classified as waste is debatable, as the organic waste often re-enters the system through other avenues (e.g. livestock fodder /animal feed, ploughed back into agricultural land), and does not necessarily enter landfills. The NWIB indicated that South Africa generated an estimated 3 million tonnes of garden and food waste in 2011; of this, 35% was recycled while the remaining 2 million tonnes were sent to landfill (DEA 2012).

It is estimated that 2.9 million tonnes of organic waste / residues³⁶ were generated in the Western Cape in 2015. In addition, it is estimated that 295 000 tonnes of sewerage sludge were generated (DEDAT 2016). Figure 7 illustrates the breakdown of organics (excluding agricultural and forestry residues) by district municipalities (DEDAT 2016), with Annex A providing more detailed figures (including agricultural and forestry residues).

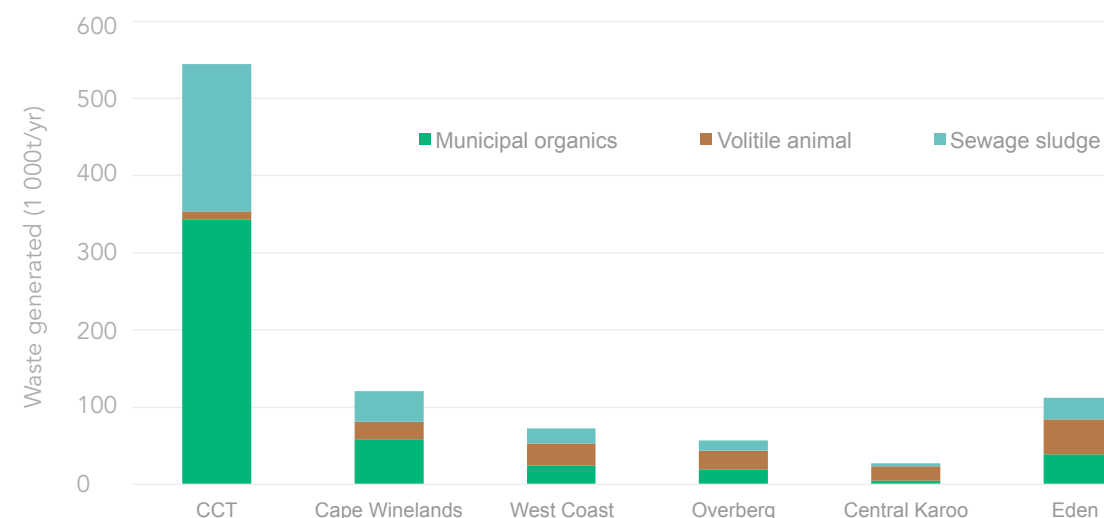


Figure 7: Organic waste and sewage sludge generated in the Western Cape

Source: DEDAT (2016)

The Western Cape hosts an array of private sector owned organic waste solutions that can serve customers from household to commercial and industrial scale. Some require specific³⁷ types of feedstock, but most allow for varied feedstock, i.e. mixed organic waste.

There is a number of existing and planned solid organic waste solution facilities³⁸ in the Western Cape identified by GreenCape based on the type of output:

- **food:** feeding programmes and obsolete stock retailers;
- **feed:** feeding livestock and insects;
- **soil:** composting and vermiculture; and
- **energy:** biofuels and biogas.

³⁵ Food waste is defined to include pre-consumer food losses and post-consumer food waste.

³⁶ Municipal, agricultural and forestry sources.

³⁷ For example, minimum tonnage, homogenous, and/or de-packaged waste.

³⁸ This excludes facilities that only accept agricultural residues and do not accept external waste streams.

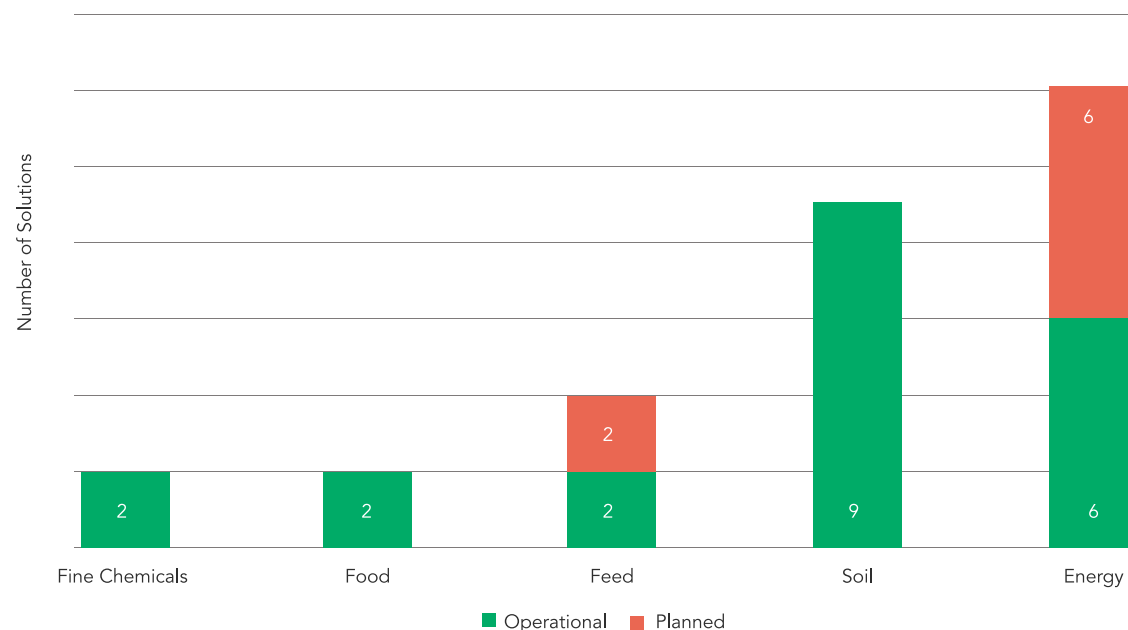


Figure 8: Number of existing organic waste solutions in the Western Cape identified through GreenCape engagements

4.1.2. Opportunities

In light of the growing demand for organic wastes, in particular for clean and homogenous streams, the market is showing significant potential. Demand will be further driven by the impending organic diversion targets mentioned in Section 3.4, which are expected to push both the private sector and municipalities to seek alternative solutions to landfill.

Diversion targets will only unlock organic feedstocks in the next five to ten years, affording private organic waste solution providers time to investigate opportunities and navigate associated regulatory requirements. GreenCape foresees the sector becoming a highly competitive market that will benefit early entrants. During 2017 the team has identified a number of developments and opportunities:

More organic solutions required

Figure 9 provides an estimate of the current and projected (five years) treatment capacity of prominent organic waste solutions³⁹ in the Western Cape. Based on GreenCape engagements with solution providers, the treatment capacity will increase by an estimated 267% from 381 000 tonnes per annum to 1 000 000 tonnes per annum in the next five years. This equates to an estimated 35% of all current organics based on current tonnages, including agricultural and forestry residues. This suggests that even with increased capacity, there is untapped potential still to be realised if residues are included as a feedstock to complement organic fraction municipal waste.

Organic waste treatment capacity will increase by 267%, from 381 000 tonnes per year, to 1 million tonnes per year in the next five years

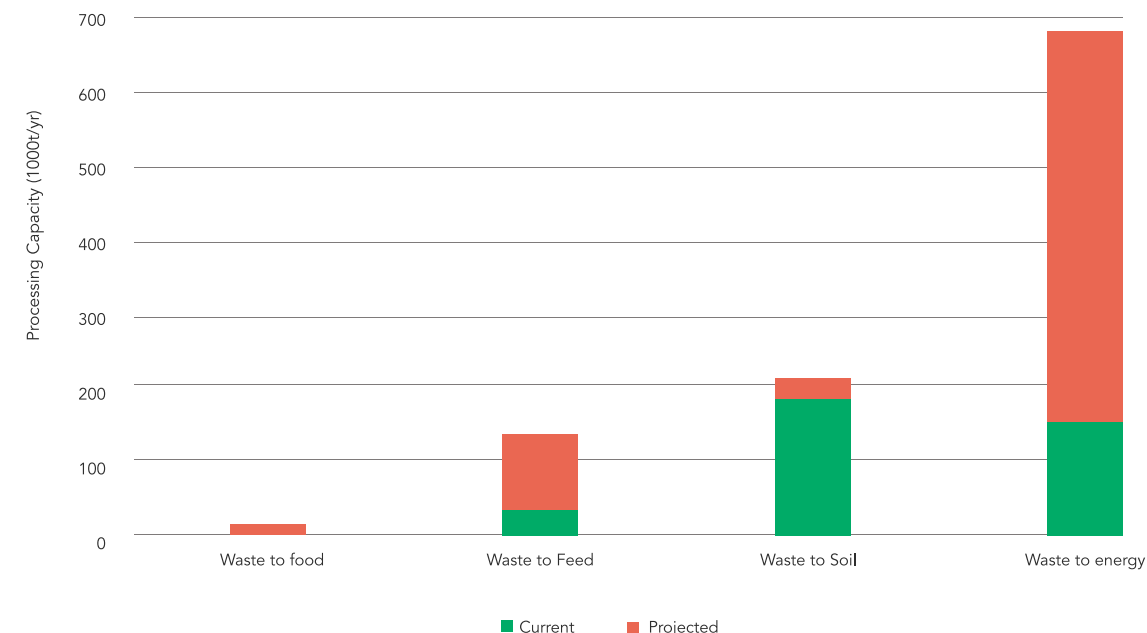


Figure 9: Processing capacity of organic waste solution providers in the Western Cape identified through GreenCape engagements

Municipal green waste

It would be an easy win for investors and businesses to target garden / green waste and agricultural residues still entering landfills. Most municipalities in the Western Cape do not divert green waste from landfill. Of the 25 local municipalities, only eight are diverting this waste to value-add solutions (DEA&DP 2017). Figure 10 shows municipalities that divert green waste and those that do not, coupled with the average annual tonnages passing through facilities (DEA&DP 2017). Local municipalities not diverting will be under pressure to find solutions for organics with the impending organic waste restrictions over the next five to ten years (Section 3.4).

These municipalities often do not have resources to unlock such opportunities themselves and they may be interested in engaging the private sector. For information on how to work with municipalities, see Section 2.1.

³⁹ | Waste to food (feeding programmes), waste to feed (feeding livestock), waste to soil (composting and vermiculture), and waste to energy (biofuels and biogas).

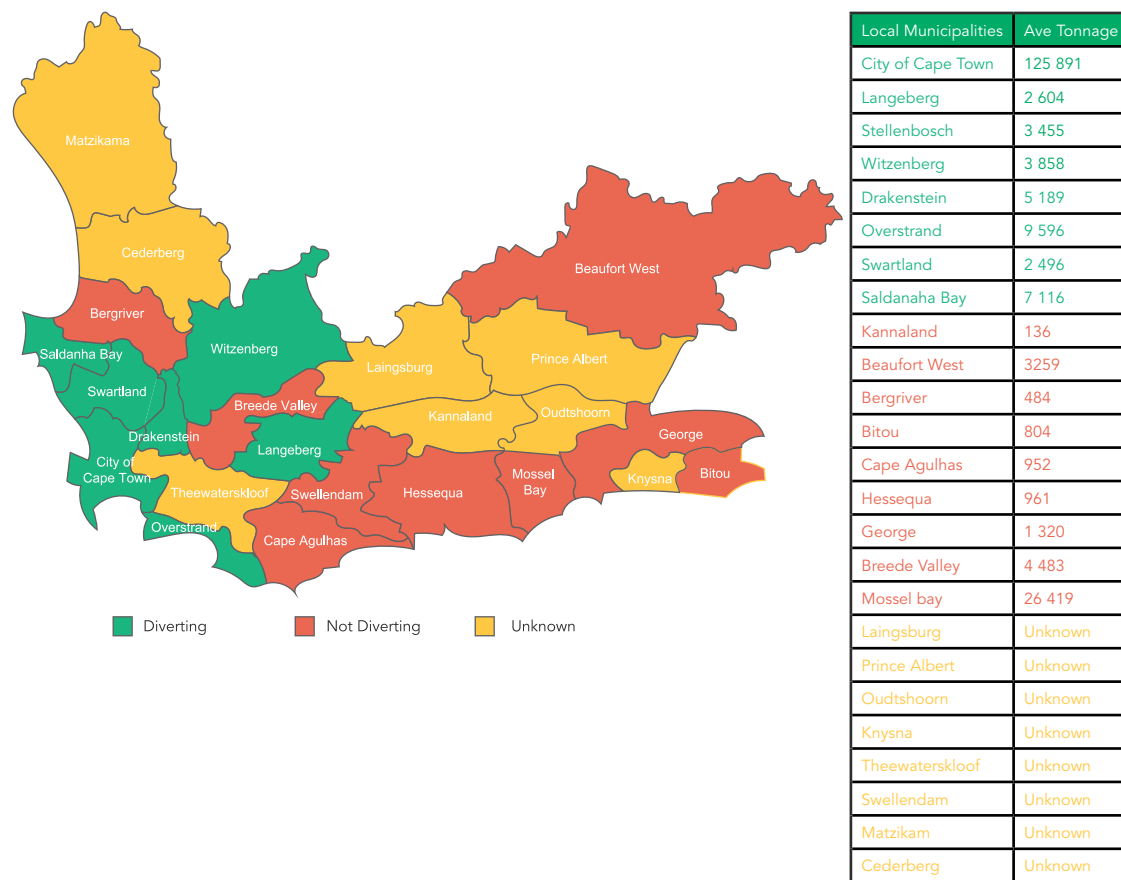


Figure 10: Average tonnages of annual green waste produced per local municipality and the extent of diversion from landfill

Source: DEA&DP (2017)

Of particular note is the Eden district municipality which generates ~568 000 tonnes of organics per annum, of which 69% is agricultural residues and 11% is forestry residues. As the district does not have any operating municipal landfills, all waste from Mossel Bay, George, Knysna and Bitou is sent to Petro SA's privately owned waste disposal facility. However, Petro SA has prohibited green waste from entering its facility.

A regional landfill should be receiving waste in the latter half of 2018, but the green waste will still have to be managed by local municipalities. This provides an opportunity for potential investors looking to extract value from green waste to work with the Eden municipalities (see Section 2.1 for on how to work with municipalities) or with Petro SA, which acts as an existing node for waste.

Small-scale decentralised solutions for abattoirs

On 23 August 2013, the change of landfill classification came into effect under National Norms and Standard for the Disposal of Waste to Landfill (GN. 636 of 2013). These changes require abattoir waste to be disposed of at a Class B landfill. Other than Cape Town based Class B landfills, local municipalities are obligated to refuse to accept abattoir waste. There are private landfills that are licensed to receive abattoir waste. However, some are too far away for many abattoirs⁴⁰ and others have prohibited the disposal of organics⁴¹. Abattoirs will have to implement AWT technologies to avoid the logistics costs of transport to a Class B landfill.

The Western Cape's 81 known abattoirs produce a total of 15 395 tonnes a year of waste (DEA&DP 2017). As there are too few AWT options available within a viable distance, the abattoir industry is in need of alternatives to landfill solutions.

Small scale, decentralised solutions are needed to treat waste from the province's 81 known abattoirs

Most abattoirs are small (60% slaughter less than 20 large stock units per day), which offers an opportunity for small scale, decentralised solutions.

GreenCape, with assistance from the Western Cape Department of Agriculture, has developed an interactive map⁴² showing the exact location and abattoir throughput for red meat, poultry and ostrich abattoirs in the Western Cape. Figure 11 illustrates the annual tonnages of abattoir waste generated within each district municipality of the Western Cape.

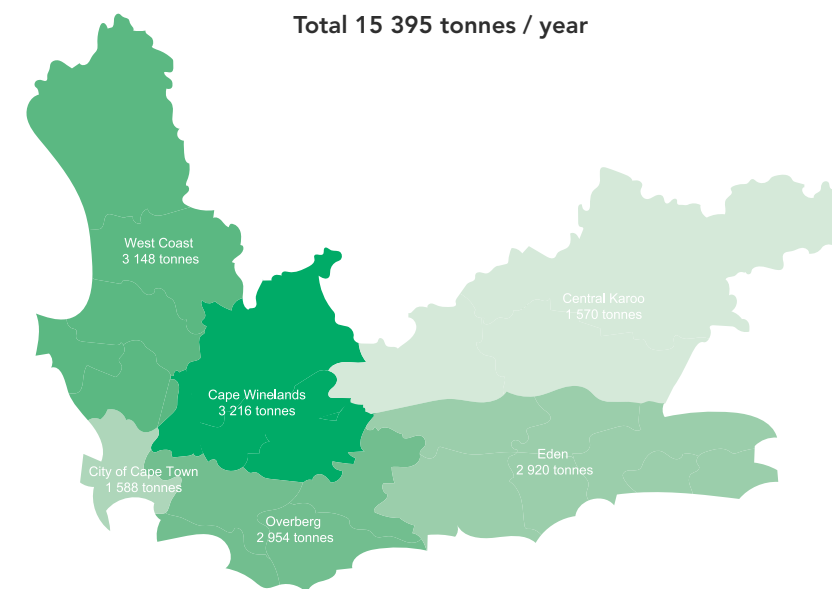


Figure 11: Annual tonnages of abattoir waste generated across the Western Cape

Source: (DEA&DP 2017)

⁴⁰ | Vissershok private landfill (Cape Town)

⁴¹ | PetroSA (Mossel Bay)

⁴² | <https://www.greencape.co.za/content/investment-opportunities-in-livestock-wastes>

Municipal solid waste

Not until recently has there been a large-scale attempt to extract, at scale, value from organics from mixed MSW in the Western Cape. The privately owned Athlone integrated waste management facility⁴³ has the capacity to extract 300 tonnes a day (~109 500 tonnes per year) of organics from MSW, and commercial and industrial waste.

With an estimated 342 500 tonnes of the organic fraction MSW generated per year in the CoCT (Figure 7), the Athlone facility processes only a third of the organics available in MSW. This means there are over 200 000 tonnes of MSW available for treatment, excluding organics from commercial and industrial activity, and agricultural feedstocks.

However, because of the complex nature of MSW, efficient and robust technologies would be needed to tap into this opportunity. Alternatively, municipalities could investigate the implementation of wet/dry waste separation-at-source systems, with effective enforcement of

There are ~200,000 tonnes per year of organic fraction municipal solid waste available in the City of Cape Town.

such systems. Although this option is costlier, the outcome would facilitate the growth of more value-add types of solutions. Either way, municipalities will be pressed to find solutions for the organic fraction of MSW.

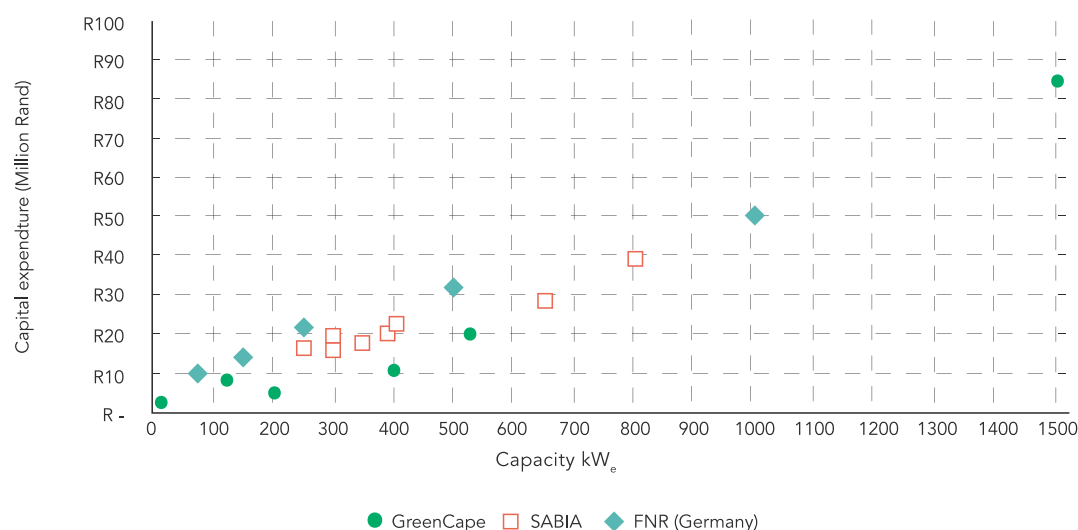


Figure 12: Biogas plant capital expenditure versus electrical capacity up to 1 500 kWe and comparison to German context

Sources: GreenCape engagements, the South African Biogas Industry Association (SABIA) and Fachagentur Nachwachsende Rohstoffe e.V. (FNR) (2014)

⁴³ Two more similar facilities are earmarked for development: one in Saldanha and one in Wellington.

Biogas investment potential

A recent GreenCape (2017) report estimates the biogas investment potential in the Western Cape at a conservative R100 million (R20 million per annum over five years)⁴⁴ with opportunities for project developers in particular. Furthermore, with a job intensity of 4 to 10 jobs per megawatt of installed electricity capacity, the job creation potential is estimated at between 10 to 25 direct jobs. These estimates take into consideration agricultural residues. However, a key takeaway from the report is that successful biogas business models have focused on being flexible about the types of feedstocks such as food waste and MSW.

Figure 12 provides investors a rough indication of the current range of capital investment into biogas facilities in South Africa for facilities up to 1 500 kW_e (green and red), and compares it to reported costs in the German context (light blue).

The viability of a plant is dependent on four key variables: the size of the facility, cost of energy, how much of current energy requirements can be replaced, and the gate fee for waste. Medium size biogas facilities of between 50 kWe and 1 MW⁴⁵ can be financially viable when waste management costs are high (assuming current energy prices and high to full utilisation of energy on-site). GreenCape analysis indicates that waste management costs could be a stronger driver for biogas installations in South Africa than energy savings, due to relatively low energy costs in South Africa (GreenCape 2017).

4.1.3. Barriers

Inadequate source separation

Organics from the pre-consumer stages are often the most sought-after feedstock by organic solution providers because the pre-consumer stages yield large-volume homogenous streams that are hardly contaminated. Where there is contamination, this is usually in the form of packaging. To gain access to these organics, solution providers must invest in de-packaging technology.

As South Africans do not have a culture of separating at source, post-consumer organics are often contaminated with non-organic material, e.g. packaging, household objects and non-recyclables. This makes extracting value from the organic fraction MSW extremely difficult and costly. Unless solution providers invest in separation technology, it will be difficult to extract value from the organics in post-consumer waste streams.

A further challenge related to post-consumer organics, is that South Africa lacks effective household hazardous waste collection systems. The non-separated organic fraction of MSW is at particular risk of contamination by household hazardous waste. This makes potential by-products of AWT applied to mixed MSW likely to be not safe for use and ultimately requiring landfill in an appropriate class of landfill. This in effect may potentially render such AWT an expensive pre-treatment and volume reduction mechanism prior to landfilling.

Although many municipal waste management by-laws require all waste generators to separate at source, municipalities do not have the capacity to enforce this. This results in a loss of valuable recyclables to contamination and contamination of organic waste which, in turn, reduce landfill diversion options. Enforcement of separation-at-source of commercial and industrial organics, especially from shopping centres and restaurants, would address these problems and increase the availability of organics for treatment.

⁴⁴ Based on revised 2018 business opportunities and industry growth.

⁴⁵ Beyond 1 MW the facility falls into the utility scale classification, which triggers the need for a generation licence in terms of the Electricity Regulations Act (Act 4 of 2006).

Viability of small-scale commercial biogas

South Africa has relatively low energy costs and landfill gate fees. Because of these factors, small-scale commercial biogas facilities of less than 50 kW do not appear to be financially viable, even assuming favourable conditions for financing and on-site energy use. Landfill disposal fees are of particular importance in this respect (GreenCape 2017).

Feeding organic waste to pigs

Organic waste solution providers are competing with pig farmers for access to organic waste feed stocks. Feeding pigs organics is not recognised as an organic waste treatment and as such is not governed by the NEMWA and associated regulations. However, the practice is governed by the Fertilizers, Farm Feeds, Agricultural Remedies and Stock Remedies Act (Act 36 of 1947). This act governs the sale of farm feed and stipulates when organics can be fed to livestock, i.e. either if the organics are intended for the feeding of domestic animals or livestock, or if the organics are registered as a feed.

This means that organic waste solutions have to adhere to waste regulations while pig farming solutions do not have to adhere to the same regulations.

Separation at source of household organic waste

The three-bin system proposed through Operation Phakisa (see Section 2.5.1) seeks to unlock the organic fraction MSW from household waste. Such a proposal could unlock 489 300 tonnes per year of this waste in the Western Cape, with 70% (342 500 tonnes) generated in CoCT. The opportunities from such an initiative would increase feedstock for recyclers, and the need for local municipalities to either invest in AWT technologies or to outsource AWT to the private sector.



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4.1.4. Recent Developments Organic Recyclers Association of South Africa established

The goal of the new association, which represents organic waste recyclers in South Africa, is to advocate for and encourage the diversion of organic waste from landfill – the primary challenge to further developing their businesses.

Athlone Integrated Waste Management Facility grappling inhomogeneous waste streams

Since its inception the Athlone private facility, equipped with a biogas plant, has had to grapple with several challenges: The amount of organic fraction MSW was less than expected.

- The design of the plant did not cater for high volumes of liquid waste.
- The expected biogas output has not been achieved.

These challenges illustrate the complexity of processing extremely inhomogeneous waste streams such as MSW.

AgriProtein expands its insect protein footprint

Apart from expanding its local footprint in the Western Cape, KwaZulu-Natal and Gauteng, the nutrient cycling (insect protein) company has partnered with Austrian engineering group Christof Industries to establish up to 25 farms per year worldwide. Using a blueprint developed with Christof Industries, AgriProtein plans to roll out 200 factories worldwide by 2027 (100 factories by 2024). Christof Industries will deliver the factories on a turnkey basis as AgriProtein's engineering, procurement and construction partner.

Waste2Food composting and vermiculture facility launched

Closing the Loop, in collaboration with the Philippi Economic Development Initiative (PEDI), Pick n Pay, and Don't Waste, launched its Waste2Food project in Philippi, Cape Town in 2017.

The R10 million investment includes a combination of in-vessel composting and vermiculture to process just under 10 tonnes of organics per day. The facility employs 20 permanent staff. It also supports neighbouring food enterprise development efforts and the training project run by PEDI.

Bio2Watt Malmesbury Biogas Plant to be constructed

Bio2Watt anticipates construction of its bovine manure biogas plant on Vylvlei Dairy farm, Malmesbury, early in 2018. The R200 million investment will process 200 to 300 tonnes of organics per day, mainly bovine manure and food waste, while employing an estimated 16 permanent staff. The expected 4.8 MWh energy produced will be fed into the electricity grid and sold to an offtaker as part of a wheeling arrangement.

Biogas industry in the Western Cape and SA in its infancy

Of an estimated 500 digesters in South Africa, 200 are located at wastewater treatment works, while the remaining 300 are being used for other purposes (Tielpelt 2016). The majority of these are small-scale domestic digesters, with only several dozen commercial / industrial scale digesters in operation. GreenCape has recorded 24 biogas facilities in the Western Cape, of which 11 are currently operational, one is decommissioned, and the remaining 12 are planned. These facilities include those that process agricultural residues and organic waste.

The Ubuntu Surplus Food Donations Bill to reduce food waste

A bill to limit civil and criminal liability of food donations, should that food cause harm to recipients, is currently being drafted for submission to Parliament. The bill seeks to provide a legal framework for curbing food wastage that is in line with international standards.

4.2. Electronic Waste

The term e-waste refers to electrical and electronic equipment⁴⁶ that have reached their end of life, or perceived end of life. Although it makes up a small percentage of the total amount of waste generated in the Western Cape, as depicted in Figure 13 (DEDAT 2016), e-waste is both highly valuable but potentially hazardous due to the various materials embedded in the equipment.

There are growing opportunities for businesses and investors in the treatment of e-waste in South Africa, and particularly the Western Cape:

- **e-waste facilities** are needed in the Western Cape;
- tap into envisioned **industry waste management plans**;
- refurbishing of e-waste, especially for small businesses;
- **recovering energy** from e-waste plastics;
- **unlocking legacy / old stocks** from government;
- **invest in the Atlantis Special Economic Zone** as a regional e-waste hub.

Key drivers of these opportunities include:

- the rise in commodities prices of metals and precious metals;
- the categorisation of e-waste as hazardous waste;
- the impending IndWMPs when promulgated; and
- Operation Phakisa if and when implemented.

South Africa has a well-developed network of e-waste collectors and aggregators, particularly in the Western Cape, with much of the e-waste being processed in Gauteng. The greatest concern of investors and businesses in this space is data on available volumes and how to gain access to those volumes, particularly to e-waste from households.

Total 7.7m tonnes / year

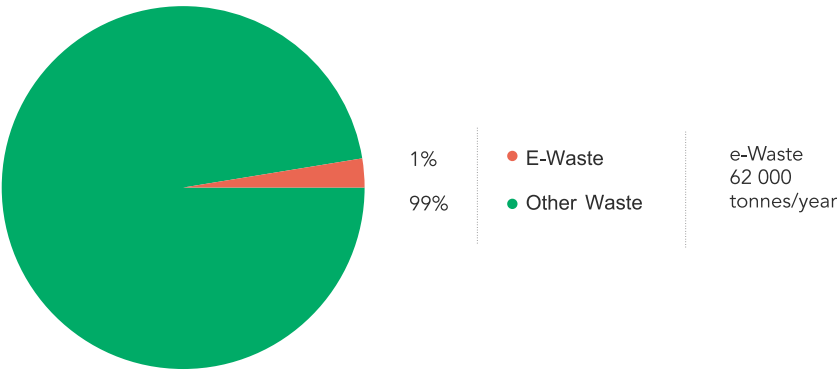


Figure 13: Proportion of e-waste (red) relative total waste (green) generated in the Western Cape

Source: DEDAT 2016

⁴⁶ Includes small household appliances; large household appliances; office, information and communication technology (ICT) equipment; consumer electronics and entertainment equipment; lighting equipment; electrical and electronic tools; security and healthcare equipment; and mixed waste electrical and electronic equipment

4.2.1. Market size

The actual tonnages of e-waste produced in South Africa are uncertain, and the methods used to provide estimates vary. The e-Waste Association of South Africa (eWASA) has indicated that South Africa produces an estimated 322 000 tonnes of e-waste per year⁴⁷. In the DST's per capita estimate⁴⁸ of e-waste produced (DST, 2017), the annual tonnage was estimated to have been 367 314 in 2016.

DEDAT (2016) reported that the Western Cape generated an estimated 62 300 tonnes of e-waste in 2015 with the CoCT generating an estimated 43 600 tonnes (70%). This has the potential to create between 1 500⁴⁹ and 1 800 jobs⁵⁰, assuming the sector accesses all available e-waste in the Western Cape. Figure 14 (adapted from DEDAT 2016) illustrates the distribution of e-waste across the Western Cape.

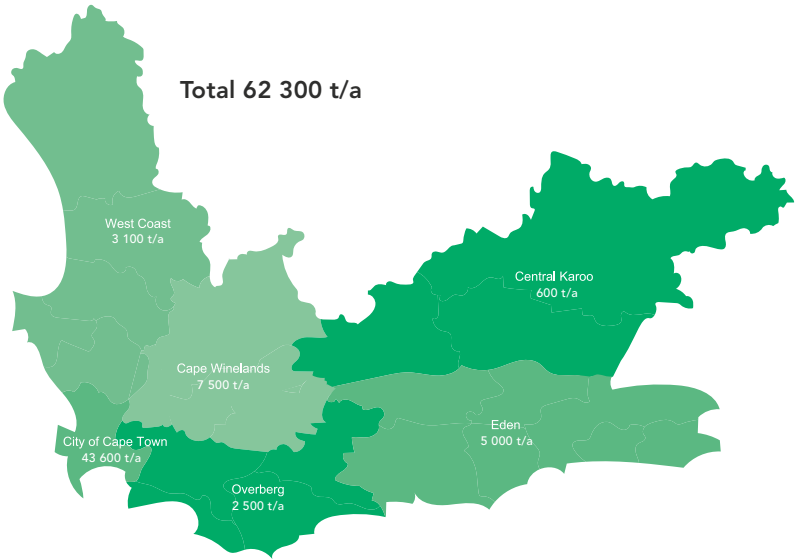


Figure 14: Distribution of e-waste generation across the Western Cape

Source: DEDAT 2016

South Africa has an integrated network of over 100 formally registered e-waste businesses / service providers along the value chain. Gauteng is regarded as the central hub for the collection, consolidation, pre-processing and processing of e-waste (~ 55% of volumes handled in 2015) (DST 2017).

Although the Western Cape lacks actual processing capacity, it does have an extensive network of over 29 stakeholders along the e-waste value chain, most of whom are collectors, consolidators, and dismantlers. The Western Cape serves as a key source and an aggregation node for the Eastern Cape and Northern Cape (DST 2017). Figure 15 illustrates the e-waste value chain and the number of businesses / service providers operating in the Western Cape.

⁴⁷ See 2017 MIR

⁴⁸ DST (2017) indicates South Africans produce an average of 6.6 kg of e-waste per year – extrapolating this to the 2016 population statistics based on Stats SA Community Survey 2016 yields the estimated 367 314 tonnes.

⁴⁹ Lydall et al. (2017) estimates 25 jobs / 1 000 tonnes handled.

⁵⁰ Maia et al. (2011) estimates 30 jobs / 1 000 tonnes handle

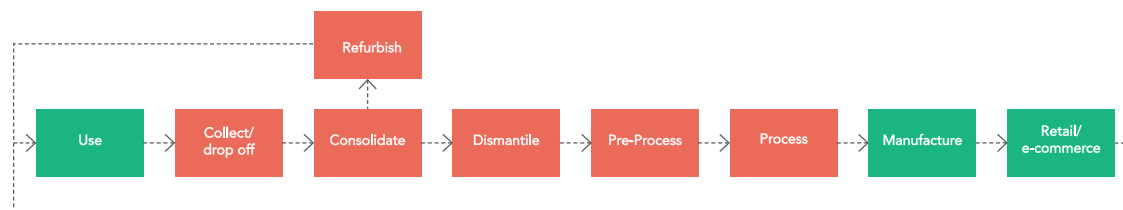


Figure 15: E-waste value chain of the Western Cape

Sources: GreenCape

Much of what is consolidated in the Western Cape is either dismantled or refurbished, and/or is sent to Gauteng for pre-processing by either Universal Recycling Company (3 000 tonnes per year) or DESCO (5 000 tonnes per year).

SA Precious Metals and Rand Refinery, both in Gauteng, are the only two formal e-waste processors. A small percentage of e-waste is exported to China and Germany. Fluorescent lamps are either sent to one of only two recyclers in the country: Reclite (Gauteng) and E-waste Africa (KwaZulu-Natal).

4.2.2. Opportunities

During the course of the year, the GreenCape team has identified a number of specific opportunities and developments that may be of interest to investors and businesses focusing on e-waste.

Growth in information and communication technology and consumer electronics

Discarded information and communications technology (ICT) and consumer electronics are highly sought-after e-waste streams, due to the high value inherent in these streams. With high growth expected in consumer electronics over the next couple of years, this bodes well for e-waste stakeholders.

DST (2016) provides a number of insights into the stock of ICT and consumer electronics in South Africa:

- In 2013, South Africa had ~8.5 million computers (PC and laptops) installed, with an average of 500 000 imported into the country each year.
- Growth in tablet ownership is estimated to increase from 1.8 million items owned in 2013 to 6 million in 2019.
- By 2019, South Africa will have 52.3 million smartphones connected to cell phone networks.

According to ICEESA (2017), South Africa is the largest consumer electronics market in Africa, with consumer electronics spending to grow at a compounded annual average growth rate of 7.3% from \$6.4 billion in 2010 to \$10.6 billion by 2018.

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Unlocking legacy volumes from government

According to DST (2017), local and provincial governments discard 45% of the e-waste collected by the sector, while businesses contribute 35% and households the remaining 20%. Government procurement policy generally requires replacing ICT and consumer electronics every five years, which has increased potential access to high-value electronics for those in the e-waste value chain. In order to unlock government ICT legacy volumes, Operation Phakisa (see Section 2.5.1) proposes to introduce a government wide e-waste asset management system. However, this depends on the finalised outcomes of the Phakisa.

Opportunities unlocked by the Industry Waste Management Plans

The greatest challenge facing the e-waste sector is access to e-waste. It is anticipated that the e-waste IndWMP will include a national collection scheme to assist with financing the development of collection infrastructure. Investors looking to enter the market, or expand operations, should register with the PRO responsible for delivering the respective IndWMPs when implemented. This will not only be a legal requirement, but also provide access to feedstock and support.

Energy recovery from e-waste plastic

There is an opportunity for local energy recovery projects employing technologies such as incineration or pyrolysis / gasification to incorporate, at least in part, non-recyclable e-waste plastics into feedstock. Due to a number of barriers, most notably the presence of flame retardants and the degradation of polymers that prevents recycling, local processing of e-waste plastics is still rather limited in South Africa. Of the 7 500 tonnes of electronic plastic recovered in 2015, 80% was exported, while the remaining 20% was beneficiated locally (DST 2017). This level of local beneficiation is consistent with the split for Western Cape based dismantlers.

Provincial licensed e-waste processing

The Western Cape does not have a licensed recycling / recovery facility. The reluctance of existing players (collectors and dismantlers) to diversify and expand in this sector restricts their growth. It will affect them negatively when the IndWMPs are implemented because they will not be able to process tonnages beyond 500 kg a month. New entrants and existing players have a great opportunity to capitalise on the void and to consider applying for a waste licence. This will provide them with a head start of 8 to 18 months, and once they have waste licences they will be able to accept large volumes of e-waste, in time for the implementation of IndWMPs.

SMME opportunities in refurbishment

Most small dismantlers supplement e-waste recycling with refurbishment. The latter is more profitable (making up to 60% of revenues) than having a stand-alone recycling business. Refurbished products, especially laptops and PCs, can be sold on the second-hand market at a higher price than they would earn as scrap. Therefore, SMMEs looking to enter the e-waste sector should consider including refurbishment in their business model.

Atlantis Special Economic Zone (SEZ) as a regional e-waste processing hub

The other countries in the SADC region are emerging as important supplementary sources of e-waste for the South African recycling sector. They are expected to increase in importance as competition for inputs to the local e-waste recycling sector intensifies. The incentives linked to the Atlantis SEZ, coupled with its location, serve as an attractive option to establish a regional e-waste processing hub. See Section 6 for details on the benefits and incentives offered to greentech investors by the proposed Atlantis SEZ.

4.2.3. Barriers

Access to e-waste

South Africa possesses the collection network and technological means to gain value from e-waste. Many of the facilities processing e-waste are not running at capacity, and as such there is an unmet demand for e-waste. However, gaining access to e-waste presents the greatest challenge. This can be attributed to insufficient drop-off points / accessibility of collection points, no separation of e-waste from other solid waste streams at source, and low public awareness of the need to dispose responsibly. Emotional attachment to equipment and concerns about data safety are also regarded as key factors in the low supply of household and/or office e-waste.

The DST (2017) highlights that access to government e-waste is not only about 'legacy' volumes. Until such time as government moves from purchasing electronic equipment to a leasing arrangement, it will be difficult to unlock end-of-life electronics to the value chain.

Lack of reliable data

There is a paucity of reliable data on the type, rate and tonnages of e-waste generated in South Africa. There is no central database of data on tonnages of e-waste generated, held in stock and/or processed, the lifespan of obsolete goods, and trade flows. In essence, e-waste data collection is in its infancy and estimates vary, as outlined earlier.

Licensing of e-waste recycling / recovery facilities

E-waste is defined as a hazardous waste⁵² and is regulated as such. These regulations limit recycling / recovery of waste to less than 500 kg a day, otherwise a waste management licence is required. This can have financial implications (the cost of a waste licence is at least R80 000, excluding specialist studies) and lead to time delays (due to legislative time frames), depending on tonnages processed (see Section 3.1).

Cherry-picking of high value e-waste

Some e-waste streams cost more to recycle and transport than the income that can be generated. As a result, many collectors focus on only high-value waste streams (such as ICT and consumer electronics), and leaving low-value streams. This will hopefully change with the introduction of levies envisioned for the upcoming IndWMP, but in the meantime it is an ongoing issue for many collectors.

4.2.4. Recent Developments

South Africa's e-waste status quo

Mintek prepared a research report⁵³ on the state of the e-waste recycling landscape in South Africa with the focus on assessing e-waste recycling technologies in operation in the country. This report was written on behalf of the DST and the Council for Scientific and Industrial Research (CSIR).

Western Cape's e-waste status quo report

The DEA&DP is undertaking a status quo assessment for ICT equipment, consumer electronics, and entertainment equipment for the Western Cape. It is hoped that this report will provide more accurate e-waste tonnages for the province, a better understanding of the stakeholders along the value chain, and key insights into related e-waste. The report is expected to be completed in the first quarter of 2018.

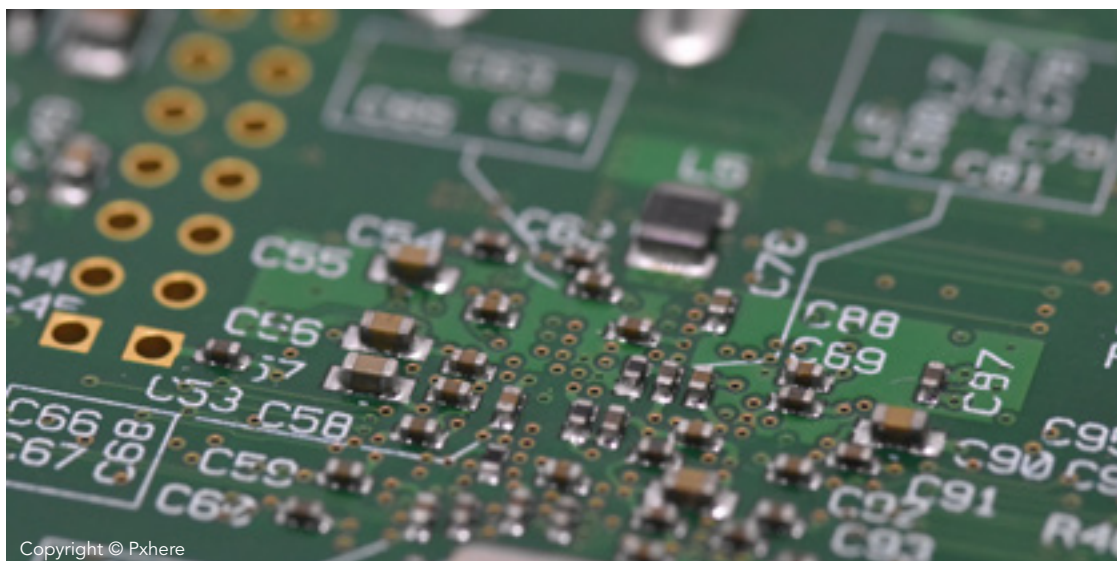
ISO guidance principles for sustainable management of secondary metals

The new ISO Guidance Principles for the Sustainable Management of Secondary Metals⁵⁴ were launched at the Thirteenth Meeting of the Conference of the Parties of the Basel Convention.

Five guiding principles aim to guide economic operators along secondary metals value chains (including e-waste) in efficient and credible implementation of improved recycling practices. This provides an opportunity for environmental consultants looking to extend / add to their service offerings of compliance / best practice for their clients.

Fluorescent lamp solutions

As of 23 August 2016, it is illegal to dispose of fluorescent lamps to landfill⁵⁵. The only alternatives are two lighting recyclers in South Africa, namely Reclite (Gauteng) and E-waste Africa (KwaZulu-Natal). Both have licensed hazardous waste facilities that claim to recycle 99% to 100% of all fluorescent lamps. Although based outside the Western Cape, they both have a collection footprint in Cape Town.



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⁵² As per Annexure 3 of the National Waste Information Regulations 2012 (GN R625 of 2012).

⁵³ Can be accessed: http://wasteroadmap.co.za/download/weee_technology_landscape_assessment_report.pdf

⁵⁴ A copy of the standards can be purchased at www.iso.org/standard/69354.html

⁵⁵ Section 5 of Chapter 2 of the National Norms and Standards for Disposal of Waste to Landfill (GN R636, 23 August 2013)



4.3. Plastics

Plastic is a broad and diverse material class consisting of several overarching categories/types, namely PET, PE-HD, PVC, PE-LD/LLD, PP, and PS. Plastic makes up 3% (222 600 tonnes per year) of all waste generated in the Western Cape Province (DEDAT 2016).

Different categories of plastic are used in many variations and combinations to meet the needs for different applications. This leads to a need for dynamic downstream processes, particularly recycling, to recover different plastic types from waste streams. Even more important is that there is an offtake, i.e. a market for this recycled material.

Total 7.7m tonnes / year

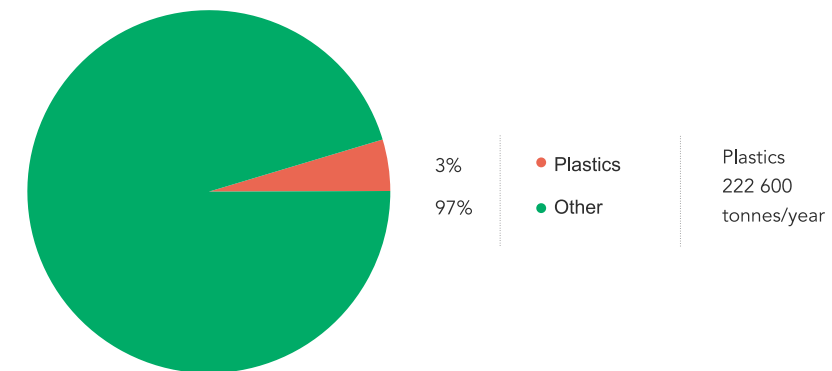


Figure 16: Proportion of plastic waste (red) relative to total waste (green) generated in the Western Cape

Source: DEDAT 2016

There are growing opportunities for businesses and investors seeking to handle plastic waste in South Africa, and particularly the Western Cape. These include:

- **Partnerships:** partnering with plastic industry associations
- **Phakisa & IndWMPs:** tapping into increased supply and demand through Phakisa's separation-at-source and IndWMPs;
- **Thermal treatment of dirty mixed plastics;**
- **Value-add to thermoform PET.**

Key drivers that are facilitating this growth include:

- rising cost of landfilling;
- growth in labour absorptive technologies;
- packaging sector incorporating recyclate into products;
- political and legislative will to shift towards value add; and
- public awareness about the drive to divert waste from landfill.

4.3.1. Market size

South Africa’s 1 800 converters managed to convert more than 1.8 million tonnes of plastics in 2016. Of this, 82% was sourced from virgin material, while the remaining 18% was from recyclate. Of this recyclate, 309 520

tonnes were generated in South Africa, and 19 579 tonnes were exported for processing into recyclate (Plastics SA 2017). As such, plastic manufacturers absorb 17.2% of the recycled plastic. Figure 17 illustrates South Africa’s dependency on virgin material, showing the conversion figures from virgin material versus recyclate material for the five major plastics types. However, recycling is on the rise and, with it, the potential to replace virgin material with secondary material. Figure 18 illustrates the steady growth in recycling tonnages over the past eight years in South Africa, with more than 5% growth since 2015. Figure 18 also shows the 2016 split in the types of plastic that were recycled in SA vs exported for recycling.

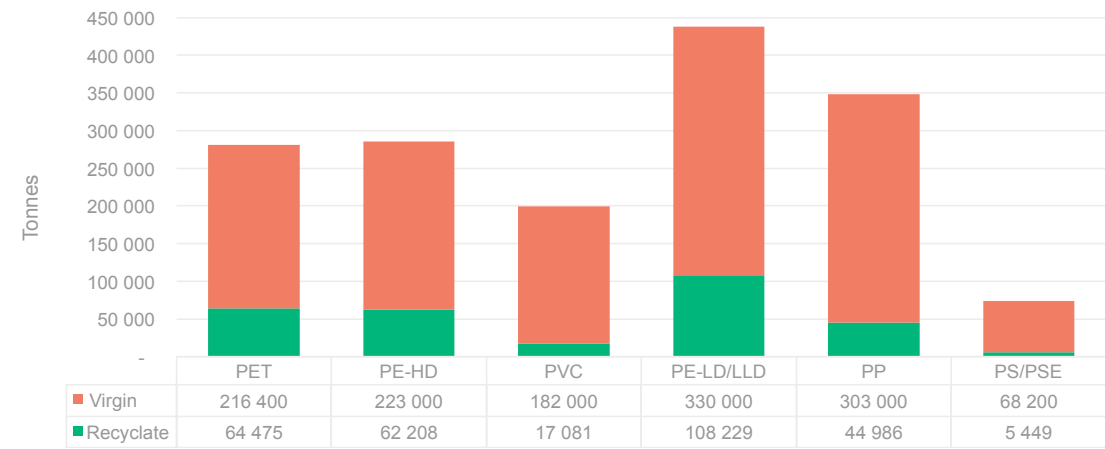


Figure 17: Major plastics converted in 2016
Source: Plastics SA (2017)

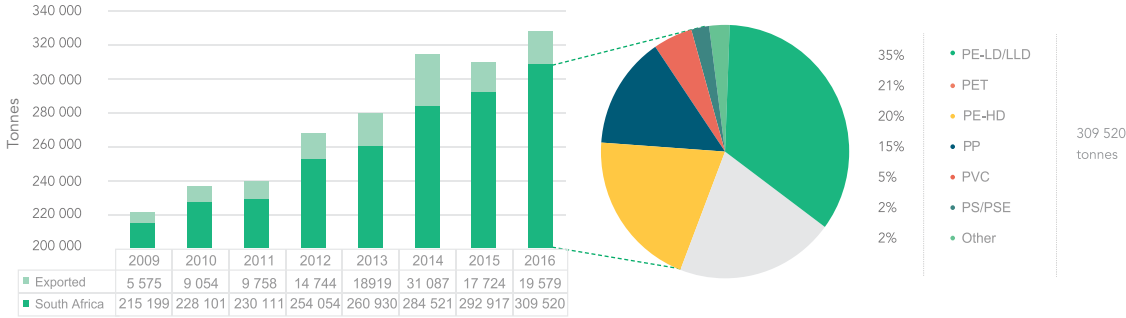


Figure 18: Types and tonnages of plastic recycled in South Africa and exported for recycling in 2016
Source: Plastics SA (2017)

The source of this material is predominantly from the post-consumer stage (75%) of the value chain as shown in Figure 19, whilst the remaining 25% is from the pre-consumer stage⁵⁶ (Plastics SA 2016).

However, the geographical distribution of the source of material is unknown. Figure 20 shows the proportion of plastic recycled per province⁵⁷. Based on this, the Western Cape is the third largest source of recycled plastic, equating to 14% (44 950 tonnes). Gauteng is the largest source with 34% (112 198 tonnes) and KwaZulu-Natal second with 16% (52 893 tonnes).



⁵⁶ According to companies representing 70% of total tonnages.
⁵⁷ This estimation is extrapolated from the total plastic recycled in 2016 and split according to the relative gross value added (GVA) of the industrial activity of the various provinces in 2016.

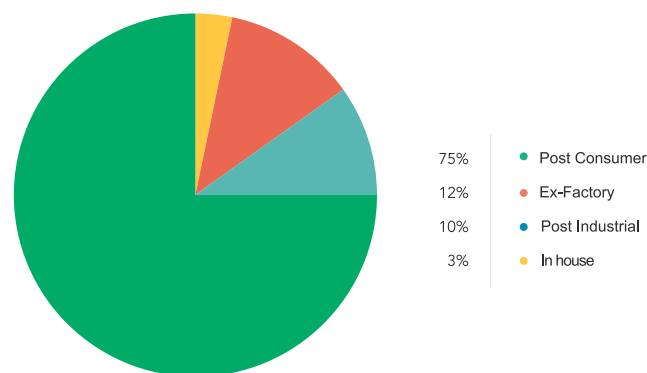


Figure 19: Source of recycled plastics in 2016

Source: Plastics SA (2017)

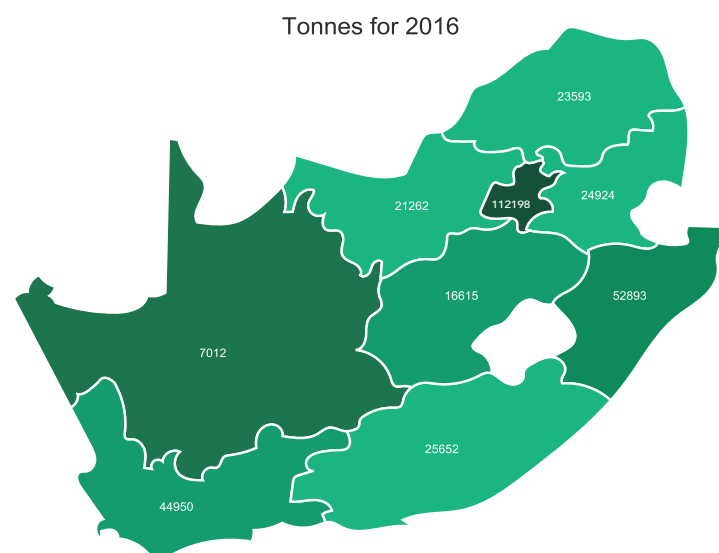


Figure 20: Provincial plastic distribution based on GVA distribution in 2016

Source: adapted from Plastics SA (2017)

As depicted in Figure 21, packaging makes up 36% of the market for recycle in South Africa, with 21% (61 904 tonnes) in flexible packaging and 15% (46 428 tonnes) in rigid packaging.

Clothing and footwear, and building and construction absorb a further 18% (55 714 tonnes) and 16% (49 523 tonnes) respectively (Plastics SA 2017).

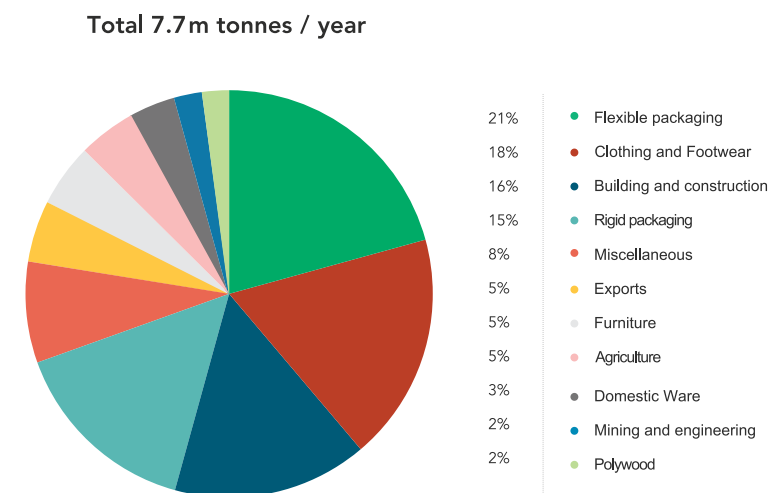


Figure 21: Market share of plastic recyclate in South Africa in 2016

Source: Plastics SA 2017

South Africa has approximately 204 active plastic recyclers. These companies provide formal employment to 6 140 staff and support an additional 51 500 waste pickers and collectors (Plastics SA 2017).

4.3.2. Opportunity

During the year, the GreenCape team has identified a number of specific opportunities and developments that may be of interest:

PACKA-CHING

Polyco⁵⁸ launched the mobile buy-back project, PACKA-CHING, in Langa, Cape Town, in August 2017. The aim of the PACKA-CHING initiative is to maximise the diversion of packaging waste from landfill by opening up new sources of packaging waste to grow the mechanical recycling thereof. This is done by increasing recycling in informal settlements and lower-income areas around South Africa through incentivising a change in recycling behaviour. The mobile buy-back centre rewards collectors for their recyclable packaging materials with money that is loaded onto a KilorandsTM Card (a special debit card), which can be used at any shop that accepts MasterCard. In this way, PACKA-CHING also contributes to poverty alleviation by presenting an income-earning opportunity to community users. To develop a national footprint, Polyco will be implementing a social enterprise development model that focuses on SMME creation. Contact Polyco for more information.

⁵⁸ | Can be accessed: <http://www.polyco.co.za>

Industry Waste Management Plan

The paper and packaging IndWMP (see Section 2.5.2) will increase available funds to grow recycling activities, including the plastics sector. This includes both the supply (access to feedstock) and demand (development of market) aspects of the value chain. Registering with the producer responsibility organisation (PRO) responsible for delivering the IndWMP is expected to provide existing businesses with opportunities for growth, while providing new entrants a great platform to access feedstocks and tap into support.

Separation at source of household waste

Initiative 8 of Operation Phakisa (see Section 2.5.1) proposes a three-bin system to separate recyclables, non-recyclables and organics from household waste. This will unlock the recycle and increase its quality. Together with Phakisa initiatives 9 (establishment of 17 material recovery facilities and six plastic pelletising plants), 13 (compiling national packaging design guidelines) and 14 (formalising EPR mechanism), initiative 8 is expected to increase access to 146 000 tonnes of recyclables (DEA 2017) and increase market demand for the material.

As noted in Figure 20, based on Gross Value Add (GVA⁵⁹), the Western Cape generated an estimated 44 950 tonnes of recycle in 2016. With 222 600 tonnes of plastic waste generated in 2015 (DEDAT 2016⁶⁰), the diversion rate may only be 20%, suggesting 177 650 tonnes are still available for recycling.

Thermal treatment for dirty mixed plastics

It is unlikely that conventional waste-to-energy solutions will replace plastic recycling in South Africa in the near future. This is mainly due to questionable net energy benefits and the market price for plastic recycle. However, there is an opportunity for dirty mixed plastics. Plastics SA estimated that 30% (343 000 tonnes in 2016⁶⁰) of the plastic produced could be used in waste-to-energy applications.

30% (~343k tonnes in 2016) of all plastics produced in SA can be used in waste-to-energy applications

Dirty mixed plastics include plastics that are not yet recyclable in South Africa or are contaminated, incorporated in multi-layer packaging, or are of low value. As the Western Cape does not yet possess a solution for these plastics, there is an opportunity for new entrants, keeping in mind, however, that even waste-to-energy solutions require a certain quality of feedstock to operate.

- **Initiative 15 of Operation Phakisa aims to establish a refuse derived fuels (RDF) plant** with the intention of building four more by 2023 across South Africa, once the demand for alternative fuels is established. DEA (2017) estimates that this initiative could generate 305 jobs, divert 120 000 tonnes of material from landfill per year, and contribute an additional R80 million to the South African GDP. This provides an opportunity for RDF manufacturing technology providers, waste handlers looking for AWT options, or organisations seeking to replace fossil coal fuels with cheaper fuels.
- The cement manufacturer **PPC is investigating the introduction of a RDF-like feed** into its De Hoek (Western Cape) kilns. The company is looking for approximately 30 000 tonnes per year of materials with a high calorific value (>20 MJ/kg) but low recycling potential, such as dirty mixed plastics. PPC is still assessing whether it would process the waste into a RDF themselves or outsource the manufacturing to other parties. This may provide an opportunity for RDF manufacturers to develop technology to produce RDF, and/or for waste aggregators looking for a cheaper alternative to landfill for non-recyclable materials.

Processing of thermoform PET

Although the beverage bottle polyethylene terephthalate (PET) has a well-established system of collection, aggregation and end market, the thermoform (tubs / trays) PET fraction does not. With no recycling operation available in South Africa, more than 77 000 tonnes of PET were not recycled in 2016. This equates to between 9 000 and 11 000 tonnes in the Western Cape. As many consumers are not aware of the difference, collectors and aggregators are inundated with this material. As such, there is an opportunity for investors to piggy back off the well-established PET waste collection system to feed potential recycling or other treatment technologies.

4.3.3. Barriers

Lack of market for plastics

According to plastic recyclers and Plastics SA, the current market for PE-LD, PE-HD and PP recycle in South Africa is saturated. Although recycling is on the rise, the market is not. As such, there is currently an over-supply of these recycled materials. Innovation or regulation concerning minimum recycle requirements in packaging/product design will be necessary to increase demand.

Lack of solutions for thermoform PET

There are three reasons for the lack of solutions for thermoform PET. First, the flexibility of thermoform PET does not allow bottle PET recyclers to process thermoform PET into flake, assuming bottle recyclers are willing to risk using the material. Second, a large percentage of thermoform products contain additives or are used in multi-layer packaging, and as such they compromise the quality of the end product. Third, the bottle PET sector is well managed by PETCO and supported through member levies. PETCO does not cover the thermoform sector as thermoform producers and manufacturers are not interested in investment / funding the collection of material, and research and development. Without this support it will remain difficult to develop a market for thermoform PET.

Confidence in waste-to-energy solutions for plastics

A large number of energy recovery technologies claim to deal with poor value waste streams. However, this is not always the case or not fully researched in a South African context. The number one question waste management companies dealing with municipal waste streams ask technology providers is: 'Can your technology take dirty mixed plastics?'⁶¹. Technology providers face other challenges, including:

- **competition for feedstock** with higher paying recyclers;
- the **quality and quantity** of ideal feedstock, in most cases polyfins;
- the **price** of feedstock;
- competition with **cheap landfill gate fees**;
- **capital and maintenance costs**;
- a lack of operational **skills and technical knowledge**; and
- in cases where energy generation is for electricity, the **low price of electricity** in South Africa.

Water security in the Western Cape

The Western Cape is in the midst of the most severe drought in recorded history. Local municipalities are restricting the use of potable municipal water, which affect recycling plants using potable water for washing incoming material. There are options for existing recyclers and those seeking to enter the market, e.g. treating and reusing on-site wastewater or treating alternative water supply, such as groundwater, rainwater or treated effluent from municipal wastewater treatment works. For further information, contact GreenCape or visit its drought support page⁶².

⁵⁹ GVA is the measure of the value of goods and services produced in an area, industry or sector of an economy.
⁶⁰ Based on 2017 MIR

⁶¹ The second question asked is, 'do you have a proof of product?'
⁶² <https://www.greencape.co.za/content/focusarea/drought-business-support>

Biodegradable plastics threaten integrity

A major concern for plastic recyclers is the use of biodegradable additives. A key requirement for growing the market for recyclate is ensuring confidence in the material as a viable alternative to virgin plastics. With the introduction of degradable additives, the integrity of products⁶³ declines, and with it the market.

Bulking agents increase cost of recycling

Manufacturers are including calcium carbonate in low-density polyethylene (PE-LD) shopping bags as a cheap bulking agent to reduce production costs. When the bags are recycled, the additive results in increased residue in wash tanks. This has resulted in higher waste disposal costs and reduced recyclate yields for the recyclers. Bulking agents present a considerable challenge to the waste economy as plastic bags are a readily recycled commodity and in most cases a good market for adding recycled content.

Sugar tax expected to decrease rPET supply / demand

In 2016, the South African National Treasury announced it would be implementing a tax on sugar-sweetened beverages. Such a tax is expected to indirectly result in decreased consumption, and subsequently a decrease in demand for both virgin and recycled PET. The proposed tax is likely to be introduced in April 2018.

4.3.4. Recent Developments
Paper and Packaging Industry Waste Management Plan

Packaging SA has the greatest buy-in from the various plastic industries. It is therefore more than likely that Packaging SA will become the PRO and oversee the paper and packaging IndWMP.

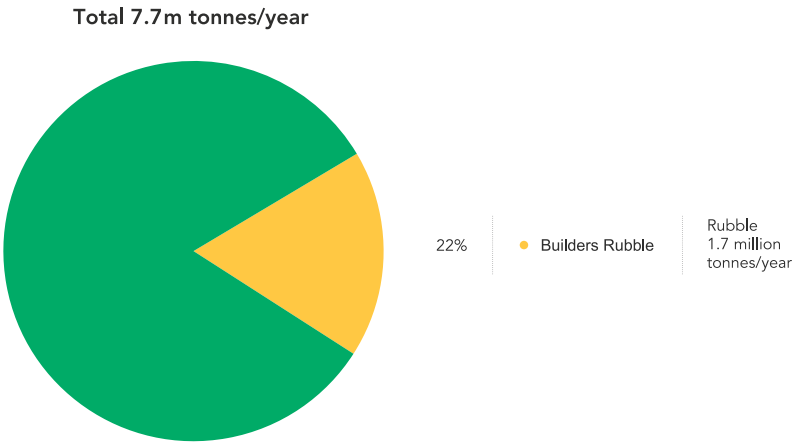


Figure 22: Proportion of builders' rubble (green) relative to total waste (yellow) generated in the Western Cape

Source: DEDAT (2016)

4.4. Builders' rubble

Builders' rubble is the mineral component⁶⁴ of construction and demolition waste. It makes up a large percentage of the waste generated in the Western Cape as depicted in Figure 22.

The applications for aggregate recovered from builders' rubble include (from highest to lowest material value):

- **re-concreting** finely ground recovered concrete incorporated into a ready-mix or precast concrete process;
- aggregate in **foundations**;
- **sub-base or base course** in parking lots and roads;
- **platforms** for housing developments, pipe bedding and fence line foundations;
- **fill**.

Processing capacity in the CoCT for builders' rubble as a construction material has increased by 44% since 2015 to 2.4 million m³ in response to market demand. There is also increasing interest and planned interventions by government and industry to increase supply, and other efforts by industry only, to increase demand of builders' rubble back into the construction industry.

The market for builders' rubble is growing across South Africa, especially in the Western Cape and Gauteng. There are growing opportunities for businesses and investors seeking to capitalise on this material, particularly in the Western Cape. The opportunities include:

⁶³ Large portion of the secondary market includes carpeting, geo-textiles, strapping, plastic timber, and piping such as is used in irrigation.

⁶⁴ Further classified into concrete aggregate (from concrete or mortar), recovered concrete masonry (from mix of concrete, mortar and fired clay brick) and masonry aggregate (from fired clay brick).

- **Untapped rubble streams** in the CoCT for processing and sale.
- **Internal use or sale of rubble** after sorting / processing by construction and demolition companies.
- **Use of recovered aggregate** in a range of applications by construction companies, which in turn saves them money.

Key drivers of these opportunities include:

- **Growing supply of feedstock** from CoCT and construction/demolition companies.
- Rising **price of virgin materials**.
- Rising **awareness** about the cost-saving potential of builders' rubble.
- **Increasing regulation** of waste flows and red tape reduction which are unlocking feedstocks and stimulating the demand for solutions to landfilling of builders' rubble.

4.4.1. Market size

Builders' rubble is still generally treated as a waste stream and sent to landfill or illegally dumped, despite its reuse potential as a secondary material. The NWIB estimates that South Africa generated 4.7 million tonnes of builders' rubble in 2012 (DEA 2012). Of this, 4 million tonnes were landfilled and the rest (0.7 million tonnes) were recycled.

In the Western Cape, approximately 1.7 million tonnes of builders' rubble are generated annually, with 1.1 million tonnes (64%) generated in the CoCT alone (DEDAT 2016).

However, many municipal landfills are now stockpiling clean rubble for use on the landfill as cover or construction of landfill roads. Where stockpiles exceed landfill operational needs, crushing contracts are being implemented or considered by some municipalities.

Where CoCT currently stockpiles an average of 70 000 m³ per month of builders' rubble, the private sector crushes and processes an average of 45 000 m³ per month. The current crushing capacity of the private sector has grown from 139 000 m³ per month in 2015 to 200 000 m³ per month in 2016⁶⁵. Figure 23 illustrates the crushing capacity for 2015 and 2016, the annual volumes of clean builders' rubble being stockpiled at all three CoCT landfills, and the 'actual' crushed rubble figures for the same years.

Crushing capacity is higher than actual crushing, and was especially high in 2016, because of a number of factors, including regulatory issues related to waste licensing and land zoning. Some companies also chose to focus on their core (non-crushing) operations during 2016. They have since re-committed to crushing due to new market opportunities.



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Figure 23: Volumes of builders' rubble crushed and landfilled, and crushing capacity in the CoCT in 2015 and 2016

There is growing recognition that builders' rubble is a useful and cheaper construction material that offers the same performance as virgin materials (provided there is adequate quality control). The quickest uptake of secondary materials has been among smaller contractors who feel economic pressures more keenly than larger companies, and are drawn to the cost and material benefits of builders' rubble. However, due to the lower prices (Figure 25) and performance of secondary material compared to virgin material, larger companies are now also actively participating in the builders' rubble market.

One of the concerns with using builders' rubble as an aggregate is guarantee of quality. As such, work to grow the builders' rubble economy is focusing on ensuring that secondary materials meet the high quality demands of buyers of the product. Three key documents are being prepared:

- **SANS 1083 (Aggregates for Concrete):** The standards are being updated by a South African National Standard (SANS) committee headed by the Concrete Institute. They will include both natural and non-natural aggregate, as well as recovered aggregate from recycling of construction materials. These standards should govern all concrete produced in South Africa, and as such, have the potential to make secondary aggregate more attractive to the formal market.
- **Guidelines for Application of Secondary Materials in Roads:** The development of the guidelines was initiated by a resolution of the Road Pavement Forum in May 2016. To develop these guidelines, a Recovered Materials Working Group⁶⁶ was formed. Once the guidelines have been tested and further pilot sections implemented, the document will become a technical SANRAL⁶⁷ report. It is expected that additional secondary materials will be included in the document as research into alternative materials in South Africa progresses.

⁶⁵ | Based on a survey of nine local crushers – two small crushers (< 10 000 m³/month), four large crushers (> 20 000 m³/month), and three in between.

⁶⁶ | Members of the working group include: South African National Roads Agency Limited, the City of Cape Town's Transport and Urban Development Authority, the Western Cape Government's Department of Public Works and Transport, the Concrete Institute, Aggregate and Sand Producers Association of South Africa, Stellenbosch University, private sector industry experts and GreenCape.

⁶⁷ | The South African National Roads Agency Limited is a South African parastatal responsible for the management, maintenance and development of South Africa's national road network.

- **A governed quality assurance process for crushing of builders' rubble:** GreenCape is convening a series of industry body meetings to develop a quality assurance process for crushing companies. The associated accreditation will assure end users of the consistency and quality of the secondary construction materials supplied.

4.4.2. Opportunities

The GreenCape team has identified a number of specific opportunities and developments that may be of interest to investors and business focusing on builders' rubble:

City of Cape Town crushing contracts

As of July 2017, the CoCT has amassed an estimated 40 157 m³ of clean builders' rubble at its three landfills. At a value of around R140/m³, the total value of the stockpiles is estimated at R5.6 million. CoCT has awarded a three-year crushing contract at its three landfills. Full-scale crushing operations will be starting in the first quarter of 2018.

The availability of secondary aggregate may provide an opportunity for investors seeking to enter the secondary building materials market.

Investments in cheaper alternatives to virgin material

Figure 24 provides an illustration of building costs over time for the Western Cape. The price of virgin material is growing faster than inflation. Average building costs⁶⁸ in the province have also increased from about R4 400/m² in 2011 to approximately R6 600/m² in 2015. Material costs make up an estimated 50% of the total building cost, with aggregate (G2, G7 and fill) and cement respectively accounting for about 16.5% and 15% of average material use (CIDB 2017). Considering that the price of recovered material is cheaper than virgin material (Figure 24), this provides a more attractive business case for investors looking to meet a growing demand for cheaper structures.

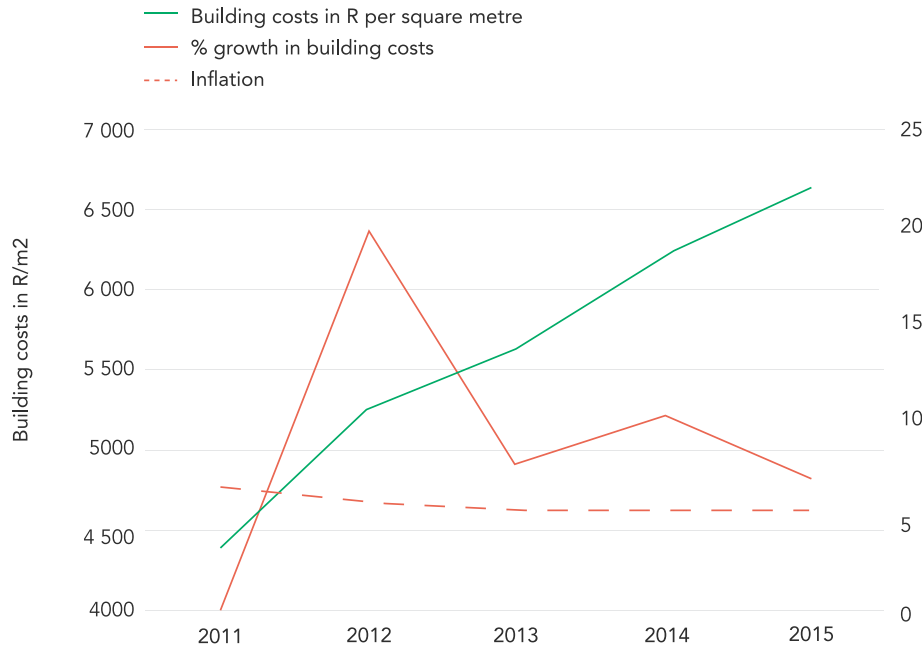


Figure 24: Change in building costs over time

Source: StatsSA 2015

⁶⁸ | On all building projects: residential, non-residential, and additions and alterations.

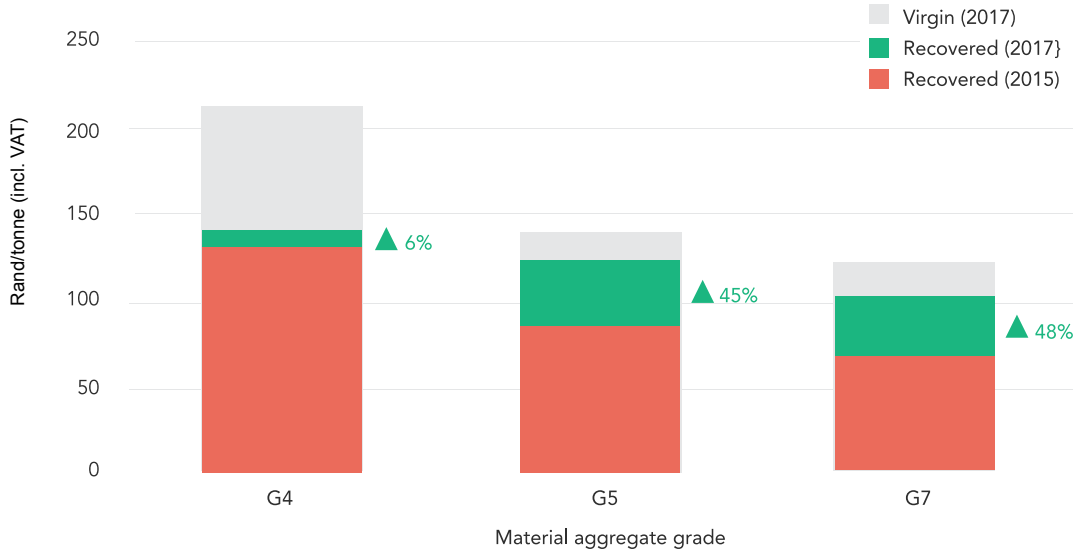


Figure 25: Price comparison of virgin and recovered aggregate in Cape Town

Source: GreenCape



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Improved ease of doing business owing to simplified procedures, which removes the need for waste licensing

The newly promulgated norms and standards for the sorting, shredding, grinding, crushing, screening or baling of general waste (Section 3.2) mean that investors entering the market or expanding operations no longer need waste licences if their facility has a foot print greater than 1 000 m². However, other thresholds may still require the need for a waste licence (Section 3.1). This historical requirement was costly and known to cause delays.

Value-add services increases the material price

The prices for different types of virgin and recovered materials are variable as illustrated in Figure 25. Companies that ensure regular laboratory testing of their products and companies that have a wider product offering generally charge higher prices. Investors entering this market, or existing business looking to capitalise, may increase the value of their products by providing extra products. This improves the business case for processing and reuse of builders' rubble.

Green procurement will drive demand for secondary material

To increase the demand for secondary material builders' rubble, Operation Phakisa (Section 2.5.1) proposes to amend government and private sector procurement policies and tender specifications to require 30% of recycled construction materials for buildings and roads. The exact terms of any requirement are currently under discussion. Whatever form the instrument to increase uptake of rubble takes, it will provide an opportunity for crushing companies looking to meet the demand.

4.4.3. Barriers

Capacity to supply the market with concrete aggregate

There are only two companies that supply recycled concrete stone on a regular basis in Cape Town. Although the market demand is infrequent, the volumes are large when required. The lack of clean concrete feedstock is the primary barrier to growth in this product.

In addition, space available for stockpiling incoming feedstock and outgoing product, as well as availability on crushing lines to crush concrete alone, are factors that limit the availability of this material.

Separation at source

Many of the crushing companies require that material entering their processing facilities must be devoid of material other than builders' rubble. However, many construction / demolition sites do not separate at source. Because separation at source does not take place, the builders' rubble cannot be isolated and sent to processors.

4.4.4. Recent Developments

Operation Phakisa focusing on builders' rubble

One of the 20 initiatives highlighted at the Phakisa (Section 2.5.1) is construction and demolition waste, with builders' rubble included as the largest component. The DEA has since proposed that both government and private sector procurement tender policies specify that new buildings and roads include 30% recycled construction material.

DEA – Construction and demolition waste project

GIBB Pty (Ltd) have been appointed by DEA to conduct a national construction and demolition waste study, to recommend management options for construction and demolition waste, as well as to consider factors which influence recycling strategy. The project will be completed in 2018.

Plaster recycling

At the time of writing this MIR, the Western Cape was expected to play host to a large-scale plaster board recycling facility in early 2018. This would be the first such facility of this magnitude in South Africa.

4.5. Municipal opportunities

Municipalities are mandated to provide certain services to their constituents. As outlined in Section 2.1, a municipality can provide the service itself or outsource the work to private contractors. There are several Western Cape municipalities seeking private sector services in 2018/19.

Table 6 below outlines budget allocations in the short to medium term for some known solid waste projects that may lead to opportunities for the private sector.

Table 5: Waste related budget allocation for various municipalities of the Western Cape (2017 – 2020) and some key infrastructure proposed

Municipality		2017-2018 Projects	2018-2020 Projects
Metro	City of Cape Town	Total Budget: R460 million	Total Budget: R1.96 million
		<ul style="list-style-type: none"> MRF/ mechanical biological treatment facility designs and development (Athlone refuse transfer station) Landfill gas infrastructure Plant and vehicle replacement Upgrading of drop-off sites Development of transfer stations and landfill infrastructure 	<ul style="list-style-type: none"> Purchase of regional landfill Plant and vehicle replacement Upgrading of solid waste depots Development of transfer stations Landfill design and development Development of landfill infrastructure
Local Municipalities	Drakenstein	Based on outcomes of the proposed Integrated Waste Management Facility	Total Budget: R13 million
			<ul style="list-style-type: none"> Landfill rehabilitation Implementation of Integrated waste management plan projects Storage (refuse bins and skips)
	Knysna	Total Budget: R5.7 million	Total Budget: R6.5 million
			<ul style="list-style-type: none"> Refuse vehicles Upgrading of transfer stations Purchase of wheelie bins
	Langeberg	Total Budget: R1.1 million	Total Budget: R1.1 million
			<ul style="list-style-type: none"> Vehicle replacement Drop-off upgrading
	Saldanha	Total Budget: R20 million	Total Budget: R70 million
			Development and extension of Vredenburg Landfill
	Stellenbosch	Total Budget: R4.4 million	Total Budget: R30 million
			<ul style="list-style-type: none"> Major drop-off construction MRF construction Vehicle purchase (compactors, collections)
District Municipality	Eden	Total Budget: R 20 million	Total budget: R150 million



Below are updates of engagements with the private sector by various Western Cape municipalities.

- **City of Cape Town:** In 2015, the City appointed a transaction advisor and a panel of professional service providers to support the transaction advisor and undertake work related to alternative waste management. The scope of the work of the transaction advisor included various feasibility assessments, to provide advice, and to assist the municipality with procuring partnerships relating to AWT and disposal. The municipality has since decided to do away with this role due to reprioritisation and the changing nature of the projects from those originally envisaged. However, the pre-selected panel of experts remains, with the projects now being driven by line departments. Projects are co-ordinated and monitored via a project steering committee and solutions are expected to be procured on a project-by-project basis.

– The CoCT has prioritised the capture of methane from landfills for own use as a transitional solution in 2017/18. Although the City's Budget Statement does not explicitly mention it, Bellville South and Coastal Park are expecting to have flaring infrastructure installed in early 2018. R56 million has been earmarked for the development of landfill gas infrastructure at the Vissershok South Landfill site over the 2017 – 2020 period

– In addition to landfill gas, the CoCT is investigating biogas generation at wastewater treatment works for municipal use.

- **Drakenstein Local Municipality** is engaged with a public private partnership (PPP) with the waste management company, Interwaste, to develop an integrated waste management facility that can process 500 tonnes per day of dirty MRF, organics (via a 2 MW anaerobic digester), and [mixed general waste] via a 10 MW incinerator.

The final EIR report was completed in October 2017, and the final commenting period was between October and December 2017. Once authorisation has been secured, construction is expected to proceed by way of a phased approach.

- **Saldanha Bay Local Municipality** is in the final stages of a procurement process for a long-term project that will generate biogas from mixed municipal waste. A private sector partner will process mixed MSW and generate biogas from the organic fraction. The biogas will then be sold to an industrial offtaker. While the private sector partner will focus on excess value from the organic waste, the municipality is planning to extend its separation-at-source programme for dry recyclables to include the whole municipality.
- **Stellenbosch Local Municipality** has completed its IndWMP, and a number of initiatives are in progress. These include a pilot MRF at the Devon Valley landfill, a plan to increase separation at source in formal residential areas, plans to increase commercial sector waste diversion (especially organic waste from restaurants) and investigation of innovative models such as swop-shops in the lower-income and informal areas.
- **Eden District Municipality**, at the time of writing, was in the final stages of procuring a service provider for a 10-year PPP for the construction and operation of its regional landfill. Waste diversion measures will continue to be rolled out at source, and implemented before and at transfer stations in the various municipalities in the district prior to landfilling.

4.6. Opportunities identified by the Western Cape Industrial Symbiosis Programme (WISP)

GreenCape is delivering the Western Cape Industrial Symbiosis Programme (WISP). This is a free facilitation service that connects companies that have an unused resource (materials, energy, water, assets, logistics, expertise) to companies that can use that resource in their production.

The programme has identified six waste streams typically not taken up by large companies due to either logistical constraints or lack of market. This creates diversion and recycling opportunities to technology providers. The streams include:

- Slag: 540 000 tonnes per year
- Paper / pulp effluent: 240 000 tonnes per year
- Foundry sand: 74 000 tonnes per year
- Treated wood: 760 tonnes per year
- Laminated glass: 200 tonnes per year
- Cardboard cores: 170 tonnes per year

For further details, contact the WISP at WISP@Greencape.co.za or phone +27 21 811 0250.



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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. Support for waste sector start-ups

National and local government are planning to develop the informal sector (kerbside and landfill pickers) and SMEs in the waste economy. Nationally, the 2011 National Waste Management Strategy (NWMS) set a target to create 69 000 new jobs in the waste sector. It aimed to create 2 600 additional SMEs and cooperatives participating in waste service delivery and recycling by 2016 (DEA 2012). However, these aims have been updated by the recent Phakisa (Section 2.5.1).

Almost all 20 of the opportunities identified will target new entrepreneurs, with DEA proposing the development of 4 300 SMEs by 2023 (DEA 2017).

Incubators, accelerators and other support entities can provide long-term mentorship and expertise to new entrepreneurs, start-ups and SMEs. Table 7 contains information on the services provided to new entrepreneurs, start-ups and SMEs, drawn from the respective entities' websites.



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Table 6: Agencies that provide services for the new entrepreneurs, start-ups and SMEs

Company	Description	Contacts
Atlantic Asset Management	Atlantic Asset Management provides debt funding to intermediaries and SMEs that have high levels of job creation and that contribute to the communities in which they work; typically to provide expansion capital to established businesses.	Navarone September Tel: 021 418 7801 Email: info@atlanticam.com Website: www.atlanticam.com
Business Partners Ltd	Fund management company that supports SME growth by providing financing, specialist sectoral knowledge and added-value services to viable SMEs in sub-Saharan Africa	Arnold February Tel: 021 464 3600 Email: afebruary@businesspartners.co.za Website: www.businesspartners.co.za
Impact Amplifier	Provides investment readiness and acceleration services; assists impact investors to source and invest in compelling opportunities, and delivers supplier development and sustainability advisory services.	Felix Phillipp Tel: 087 260 3471 Email: info@impactamplifier.co.za Website: www.impactamplifier.co.za
Anglo American – Zimele – Enterprise Development	Facilitating the development of commercially viable and sustainable small and medium enterprises, thereby supporting job creation and inclusive economic development.	Rose Sigadi Tel: 011 638 9111 Email: zimele@angloamerican.com Website: southafrica.angloamerican.com/our-difference/zimele-enterprise-development.aspx
Igalelo	Social enterprise and inclusive business, funded by l'Alliance Française.	Hugo Capdevielle Tel: 076 755 5003 Email: hugo@inco.co.com Website: www.igalelo.co.za
Technology Innovation Agency ⁶⁹	Global initiative with the goal of promoting clean technology innovation and supporting small and medium-size enterprises (SMEs) and start-ups.	Gerswynn McKuur Tel: 012 472 2700 Email: Gerswynn@tia.org.za Website: southafrica.cleantechopen.org
University of Stellenbosch Business School (Small Business Academy)	Participants become part of the programme for nine months, after which they graduate with an NQF level 5 certificate from Stellenbosch University. The programme includes training, mentoring, workshops, and engaged learning with MBA and other students.	Hester Franzsen Tel: 021 918 4224 Email: Hester.Franzsen@usb.ac.za Website: www.usb.ac.za/Pages/AboutUs/Small-Business-Academy.aspx

⁶⁹ | Also host the Global Cleantech Innovation Programme

Table 6: Agencies that provide services for the new entrepreneurs, start-ups and SMEs (continued)

Company	Description	Contacts
Black Umbrellas ⁷⁰	The programme focuses on promoting entrepreneurship as a desirable career path, and on nurturing 100% black-owned businesses in the critical first three years of their existence through the provision of nationwide incubators.	Reza Gallant Tel: 021 447 7156 Email: reza@blackumbrellas.org Website: www.blackumbrellas.org
Climate Innovation Centre ⁶⁹	Technology and business incubator dedicated to supporting South African start-ups and small businesses operating in the green economy space by offering them access to finance, technical and business advisory facilities, information, and markets.	Rethabile Melamu Tel: 012 844 0005 Email: RMelamu@theinnovationhub.com Website: www.cicsouthafrica.co.za
Fetola	Enterprise and supplier development design and implementing value-adding solutions that benefit entrepreneurs, emerging SMEs and corporate clients nationally.	Chantal de Kock Tel: 086 111 1690 Email: info@fetola.co.za Website: www.fetola.co.za
Riversands Incubation Hub	The Hub's incubation programme nurtures small and micro enterprises (SMEs) by mentoring and supporting them to become fully-fledged, formal businesses.	Anne Vicente Tel: 011 012 4602 Email: annev@riversandsihub.co.za Website: www.riversandsihub.co.za
South African Renewable Energy Business Incubator	Green technologies, clean technologies and renewable energy technologies incubator.	Elize Hattingh Tel: 021 577 2719 Email: elize@sarebi.co.za Website: www.sarebi.co.za
SMEasy	Global initiative with the goal of promoting clean technology innovation and supporting small and medium-size enterprises (SMEs) and start-ups.	Darlene Menzies Tel: 086 176 3279 Email: sales@smeasy.co.za Website: www.smeasy.co.za
SME Toolkit South Africa	Online resource for SMEs and entrepreneurs.	Petro Bothma Tel: 011 713 6600 Email: enquiries@businesspartners.co.za Website: www.southafrica.smetoolkit.org

Table 7 provides a list and information of available waste-specific funding and support solutions. Details were obtained from the respective organisations' websites.

⁶⁹ | As part of The Innovation Hub
⁷⁰ | Previously Shanduka Black Umbrellas

Table 7: List of funding solutions and incentives – waste-specific

Company	Description	Contracts
PETCO	Economic support through incentives or subsidies is provided to PET recyclers who collect bottles and process them into recycled PET in preparation for manufacturing new products. PETCO also supports projects and initiatives through sponsorship of infrastructure and equipment that unlocks collections, and helps collectors improve their efficiencies and the quantity and quality of PET collected.	Janine Basson Tel: 021 794 6300 Email: janine.basson@petco.co.za Website: www.petco.co.za
POLYCO	Polyco's funding support programme provides investments in the form of infrastructure that is necessary to grow the collection, recycling, recovery or beneficiation of polyolefin plastics to meet the IndWMP targets. The focus of this funding is to support the entire recycling industry value chain, from collections through to end use development. Funding mechanisms in the form of either grants or interest-free loans are awarded to qualifying companies who best meet the Project Funding Support Criteria.	George Blackwood Tel: 021 531 0647 Email: george@polyco.co.za Website: www.polyco.co.za

Sources: PETCO and POLYCO

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, together with 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](#)⁷¹.

⁷¹ | <https://www.greencape.co.za/assets/Uploads/GreenCape-Finance-Database-v4.xlsx>

5.2.2. Other Database
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 more than 200 lenders and 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.

AlliedCrowds Database

AlliedCrowds (alliedcrowds.com) 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](#)⁷².

5.2.3. Ecosystem observations

Funding opportunities of note

There is always demand for affordable working capital. **SCF Capital**, spun out of the Development Bank of South Africa's Green Fund, provides extremely competitive rates, specifically for 'green' companies.

Funding gaps of note

While excellent work has been done to fund large-scale projects such as the utility scale REIPPPP, the relatively smaller pool of domestic funding and capital intensive nature of the cleantech industry, means that a number of funding gaps remain, particularly for SMEs.

- **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 10 times cheaper to fund at any given stage of development.

- **Small-scale project finance (up to R50m) is difficult to acquire**, as funders of projects are looking for projects worth at least R50m (usually R100m) 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.

5.2.4. How the GreenCape Green Financial Desk assists investors

The Green Finance Desk (GFD) primarily acts as data source. The GFD works across all sector desks at GreenCape and its objectives include:

- **Networks:** develop a network of financial institutions (private and public) with green finance interests.
- **Knowledge:** develop an understanding of the main green projects requiring investment / financing.
- **Removing barriers:** break down any barriers that exist between green finance and green projects
- **Facilitation:** facilitate the implementation / adoption of innovative financing solutions for green economy business models.
- **Ad hoc support:** 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 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. It will reduce the cost to employers of hiring young people 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% per year over 10 years.
- **VAT and Customs Relief:** companies located within a customs-controlled area (CCA) will be eligible for VAT and customs relief in terms of the relevant legislation (dti 2015).

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

- **12I Tax Allowance Incentive;**
- **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.



⁷² | <https://www.greencape.co.za/content/focusarea/green-finance-databases>

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 26 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 26: 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

Annex A: Western Cape waste tonnages

Table 8: Total waste tonnages generated per district municipality / metro for 2016

Source: DEDAT (2016)

Material	Western Cape	CoCT	Cape Winelands	West Coast	Overberg	Central Karoo	Eden
Municipal Solid Waste	4 080 100	2 762 100	559 200	204 700	180 700	40 900	332 500
Organic	489 300	342 500	58 700	24 500	19 600	4 900	39 100
C&D	1 704 500	1 091 000	272 700	85 200	85 200	17 000	153 400
Non-recyclable	685 500	479 800	82 300	34 300	27 400	6 900	54 800
Paper	295 200	206 600	35 400	14 800	11 800	3 000	23 600
Plastics	222 600	155 900	26 700	11 100	8 900	2 200	17 800
Glass	151 600	114 400	19 600	8 200	6 500	1 600	1 300
Metals	531 400	371 900	63 800	26 600	21 300	5 300	42 500
Tyres	18 080	12 700	2 200	900	700	180	1 400
e-Waste	62 300	43 600	7 500	3 100	2 500	600	5 000
Commercial / Industrial	881 000	637 400	99 000	39 500	30 500	4 300	70 300
Settled sewerage sludge	294 900	191 000	39 800	19 500	12 700	3 500	28 400
Agricultural residues	2 125 100	46 600	277 700	885 100	507 500	15 800	392 400
Volatile animal waste	149 700	11 200	22 500	28 100	24 300	18 700	44 900
Forestry residues	91 100	9 100	4 600	4 600	9 100	0	63 700
Total	7 702 280	3 713 700	1 012 500	1 185 500	768 000	83 980	938 600

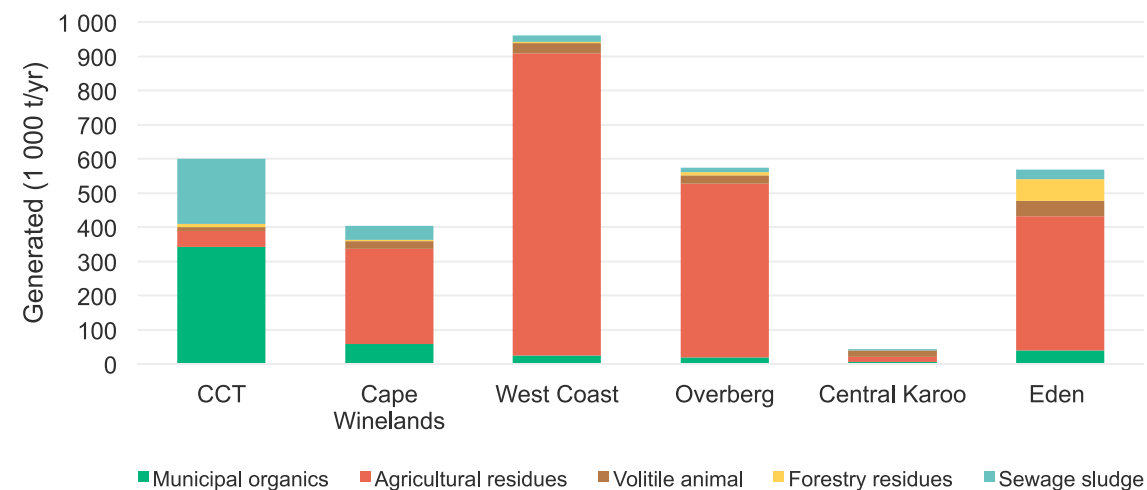


Figure 27: Organic waste, sewage sludge and agricultural residues generated in the Western Cape.

Source: DEDAT (2016)

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