



Waste

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2020

Market Intelligence Report

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GreenCape

GreenCape is a non-profit organisation that works at the interface of business, government and academia to identify and remove barriers to economically viable green economy infrastructure solutions. Working in developing countries, GreenCape catalyses the replication and large-scale uptake of these solutions to enable each country and its citizens to prosper.

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List of abbreviations and acronyms

BBF	Biosolid Beneficiation Facility
CDM	Clean Development Mechanism
CGCSA	Consumer Goods Council of South Africa
CCT	City of Cape Town
DEA	National Department of Environmental Affairs (former)
DEDAT	Western Cape Provincial Government Department of Economic Development and Tourism
DEFF	National Department of Environment, Forestry, and Fisheries
DBSA	Development Bank of Southern Africa
DTIC	National Department of Trade, Industry and Competition
EAP	Environmental Assessment Practitioner
EAPASA	Assessment Practitioners Association of South Africa
ECA	Environment Conservation Act (No. 73 of 1989)
IDC	Industrial Development Corporation of South Africa
EIA	Environmental Impact Assessment
EPR	Extended Producer Responsibility
eWASA	e-Waste Association of South Africa
FLWVA	Food Loss and Waste Voluntary Agreement
GFCF	Gross fixed capital formation
GHG	Greenhouse Gas
GVA	Gross value added
HCRW	Health Care Risk Waste
IWMF	Integrated Waste Management Facility
IndWMP	Industry Waste Management Plan
MBT	Mechanical Biological Treatment
MRF	Material Recovery Facility
MSW	Municipal Solid Waste
NEMA	National Environmental Management Act (No. 107 of 1998)
NEMAQA	National Environmental Management Air Quality Act (No. 39 of 2004)
NEMWA	National Environmental Management: Waste Act (No. 59 of 2008)
ORASA	Organic Recycling Association of South Africa
PASA	Polystyrene Associations of South Africa
PCB	Printed Circuit Board
PET	Polyethylene Terephthalate
PETCOPET	PET Recycling Company
POLYCO	Polyolefin Responsibility Organisation
PRO	Producer responsibility organisation
RecMat	Recovered Materials Working Group
RESP	Recycling Enterprise Support Programme
SAEWA	Southern African E-Waste Alliance
SAPRO	South African Plastics Recycling Organisation
SAVA	Southern African Vinyls Association
SoWR	State of Waste Report
SSEG	Small-scale embedded generation
TGRC	The Glass Recycling Company
WRAP	Waste and Resources Action Programme

Executive summary

At the start of 2020, the South African waste management landscape is waiting for numerous regulatory changes to be implemented, and key documents to be published. Once this regulatory certainty is provided, it should ultimately unlock opportunities, among others, in the plastic, organics, electronic, construction, and demolition waste sectors.

According to the then Department of Environmental Affairs (2017), the waste economy contributed ~R24.3 billion to the South African GDP in 2016. It provided 36 000 formal jobs and supported ~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 (a tonne is a metric unit of weight that is equal to 1 000 kilograms). The anticipated spin-offs could include 45 000 additional formal jobs and 82 000 indirect jobs, as well as create 4 300 SMMEs.

In 2015, the Western Cape province generated over 7.7 million tonnes of waste, of which ~2.4 million tonnes (31%) consisted of municipal solid waste, ~2.4 million tonnes (31%) of agricultural and forestry waste/residues, ~1.7 million tonnes (22%) of construction and demolition waste, and ~0.9 million tonnes (11%) of commercial and industrial waste. The remaining ~0.4 million tonnes (5%) consist of other waste streams.

Of the total for the province, the City of Cape Town (CCT) generates a substantial portion (48%) of the waste, which includes ~1.7 million tonnes of municipal solid waste, ~1 million tonnes of construction and demolition waste, ~0.6 million tonnes of commercial and industrial waste, ~0.07 million tonnes of agricultural and forestry waste/residues, and ~0.3 million tonnes of other waste streams.

Opportunities within the organics, e-waste, plastics and builders' rubble sectors have the potential to add between R661.3 and R1 086.4 million in value to the economy:

- **Organics:** The Western Cape generated ~533 745 tonnes of MSW organics, and ~326 935 tonnes of commercial and industrial organics in 2019. Combined, the market value of MSW and commercial and industrial organics is estimated between R86 million and R162 million¹. At municipal level, the greatest value lies in the CCT metropolitan area with an estimated market value of between R61 million and R115 million. In addition, the cost of landfilling commercial and industrial organics results in an estimated ~R138 million² in disposal overheads for business for 2019.
- **Plastics:** The Western Cape generated between 138 278 and 162 138 tonnes of plastics in 2019. The market value is estimated at between R473.8 and R631.7 million per year³. At a municipal level, the greatest value lies in the CCT metropolitan area with an estimated market value of between R333.5 and R444.7 million.
- **E-waste:** The Western Cape generated ~42 592 to ~67 906 tonnes of e-waste in 2019. The market value is estimated at R53.5 to R106.7 million per year. At a municipal level, the greatest value lies in the CCT metropolitan area with
- **Builders' rubble:** The Western Cape generates ~1.7 million tonnes of builders' rubble. The market value is estimated at ~R48 million per year. At a municipal level, the greatest value lies in the CCT metropolitan area with an estimated market value of R30.7 million.

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, plastics, and e-waste. These changes will also help to simplify rules and procedures for alternative waste treatment technologies and activities; as well as unlock funds and feedstocks for, among others, the private sector.
- **Extended producer responsibility:** Since the withdrawal of the Industry Waste Management Plans by the Minister of Environment, Forestry and Fisheries, the paper and packaging, lighting equipment, and electrical and electronic industries will likely be required to develop and implement extended producer responsibility measures. This will support 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.
- **Increasing cost of disposal:** Rising management costs are pushing up the price of landfilling in the Western Cape and the CCT metropolitan area in particular. This increases demand from waste generators for alternative waste treatment solutions, which in turn improves the business case for solutions.
- **Dwindling landfill airspace:** Most of the Western Cape province is experiencing a landfill airspace crisis. Of the 25 municipalities, 22 have less than five years left of airspace (see Section 2.4.2.). This is expected to continue in the medium term. Crises like these provide opportunities for municipalities to diversify their waste management models.

¹ A value of between R100 (based on R20 per 20 kg of compost sold in store, which is generated from 200 kg of organic waste) and R188 (based on the Waste Road Map (DST, 2014) value for organics) per tonne of organics

² Based only on the CCT landfill gate fee of R584 (incl. tax) per tonne of general waste, and excludes transport and treatment fees (if required).

³ Based on value of between R1 950 and R2 600 per tonne.

Summary of waste value-add opportunities in the Western Cape

Stream	Opportunities	Drivers	Enablers
Organics	Value-add to between 185 000 and 293 000 tonnes a year of contaminated CCT metropolitan area MSW organics	<ul style="list-style-type: none"> Organic waste 2027 landfill restrictions Decreasing municipal landfill airspace 	<ul style="list-style-type: none"> Easing of composting regulations Carbon credit market Growing demand for CO2 Increasing cost of electricity
	Value-add to cleaner / pre-processed organics Stellenbosch local municipality	<ul style="list-style-type: none"> Increasing cost of landfilling Carbon tax liability (future) 	<ul style="list-style-type: none"> Electricity wheeling (potential future) Food Loss and Waste Voluntary Agreement
	Value-add to several hundred tonnes a day of low value digestate from potential municipal MBT	<ul style="list-style-type: none"> Market demand for clean dry recyclable feedstocks 	
	Further value-add to 109 – 136 tonnes a day of CCT’s dried Biosolids Beneficiation Facility digestate		
	Value-add to several hundred tonnes a day of low value digestate from private MSW biogas solutions (currently not operational)		
	De-packaging technologies for processing packaged organics		
Plastic	Replacing virgin material with recycle	<ul style="list-style-type: none"> Decreasing municipal landfill airspace 	<ul style="list-style-type: none"> South African Plastics Pact Municipal infrastructure investments
	Technology to increase recycle quality	<ul style="list-style-type: none"> Perceived job potential Global / local plastic sentiment 	<ul style="list-style-type: none"> Extended Producer Responsibility Increased foreign demand for recycle
E-waste	National pre-processing and processing capacity	<ul style="list-style-type: none"> Precious metal prices 	<ul style="list-style-type: none"> Extended Producer Responsibility
	A licensed pre-processing / processing facility for the Western Cape	<ul style="list-style-type: none"> National E-waste Landfill Ban (2021) National Battery Landfill Ban (2021) 	
	Processing of SADC feed-stocks	<ul style="list-style-type: none"> Perceived job potential 	
Builders’ Rubble	Value-add to 9 million tonnes of builders’ rubble for application as a secondary construction material – across all applications	<ul style="list-style-type: none"> Increasing costs of virgin material Decreasing municipal landfill airspace 	<ul style="list-style-type: none"> Performance evidence base from pilot sections, including recovered aggregate Auditable quality assurance systems for the handling and processing of rubble
	Value-add to 2.25 million tonnes of builders’ rubble for application as a road-build-ing material	<ul style="list-style-type: none"> Lower logistical costs of the supply of secondary material 	<ul style="list-style-type: none"> Municipal focus on landfill diversion
	Manufactured building sand from rubble	<ul style="list-style-type: none"> National Roads Policy (future) Material availability (sand) 	<ul style="list-style-type: none"> Municipal diversion focus Carbon Tax Act negative impact on business case for competing virgin material with road building materials cement and asphalt
	Municipal builders’ rubble crushing contracts for the CCT, and the Stellenbosch and Saldanha Bay municipalities		

³⁵ Short Term (0-3 years), Medium Term (3-5 years), Long Term (+5 years)

Stream	Barrier / Risk	Term ³⁵	Macro-Environment
Organics	<ul style="list-style-type: none"> Inadequate source separation Composting registration regulations Confidence in bioenergy projects Competition for organics by pig farmers Short procurement durations Difficult procurement / tender process Sensitive / lack of market for by-products Lack of offtake for tailings Tailings landfill disposal costs Lack of electricity grid feed-in 	Medium – Long	<ul style="list-style-type: none"> Operation Phakisa focus on organic waste Greenhouse gas reduction commitments / ambitions CCT envisions generating own electricity Consumer awareness of food waste and its impact on the environment
		Short – Medium	
		Medium – Long	
		Short – Long	
		Medium – Long	
		Short	
Plastic	<ul style="list-style-type: none"> Inadequate source separation Contamination Delay in implementation of EPR Low end-market growth Fluctuating virgin resin prices 	Short – Medium	<ul style="list-style-type: none"> Operation Phakisa focus on plastics Consumer awareness International commitment
		Short – Medium	
E-waste	<ul style="list-style-type: none"> Lack of reliable data Access to feedstocks Licensing of recycling / recovery facilities Cherry-picking of high-value e-waste DEFF view of transboundary e-waste movement Delay in implementation of EPR 	Medium – Long	<ul style="list-style-type: none"> Operation Phakisa focus on e-waste International commitments Transboundary movement (Basil convention)
		Short – Medium	
		Medium – Long	
Builders’ Rubble	<ul style="list-style-type: none"> Poor perception by construction industry Poor practice of some in crushing industry Lack of quality standard for handling / processing Lack of specification for road building aggregate, inclusive of recovered aggregate 	Medium – Long	<ul style="list-style-type: none"> Operation Phakisa focus on C&D Waste Greenhouse gas commitments / ambitions
		Medium – Long	
		Short – Medium	
		Short	

Introduction and purpose

This report provides insights into the South African and the Western Cape waste sector. It also outlines market opportunities for investors who are active or interested in providing alternative waste treatment and beneficiation solutions.

What's new?

For investors and business owners who have read GreenCape's 2019 Waste MIR, the following are new developments discussed in this report.

Whereas the 2019 report focused on the waste opportunities opened up by industry changes at provincial and national level, this year's report provides updates on:

- market trends in organics, plastics, builders' rubble and e-waste;
- industry developments, in particular on the industry waste management plans and a shift to extended producer responsibility, the increase in landfill gate fees, the State of Waste Report; the Chemical and Waste Phakisa, and;
- new opportunities in the markets for organics, plastics, e-waste, and builders' rubble.

This MIR has been compiled by GreenCape's Waste Sector Desk. It highlights insights and opportunities gathered through engagements with stakeholders in, and research on, the national and Western Cape waste sectors.

Section 2 provides an overview of the waste sector in South Africa, with a focus on the Western Cape. This is followed by an overview in **Section 3** of key policies and regulations that guide and affect the sector. **Section 4** provides an overview of market opportunities, drivers, barriers, risks, and recent developments in organics, e-waste, plastics, and builders' rubble. In **Section 5**, the focus is on available finance opportunities and other incentives.

The case for the Western Cape as a greentech hub for Africa is covered in **Section 7**. This is followed by **Section 8**, which outlines GreenCape's work and the opportunities for investors across the South African and Western Cape green economy.

For queries or to access any of our support services, contact GreenCape's Waste Sector Desk at +27 21 811 0250 or email waste@greencape.co.za.



2

Sector overview

This section provides investors, waste sector businesses and new entrants with an overview of South Africa's general waste sector, with a focus on the Western Cape.

GreenCape has been producing an annual Waste Economy MIR since 2014. Since then, the momentum in the waste sector has been building, albeit slowly, towards a waste economy increasingly characterised by waste beneficiation. However, over the course of the last year, this momentum has been slowed down somewhat across the board — from government, business, industry and the public. This is mainly due to the waste sector waiting for numerous regulatory changes to be implemented and key documents to be published. Some of this has to do with change and expansion of South Africa's environmental authority to the Department of Environment, Forestry and Fisheries (DEFF), which is also under new leadership. It is hoped that Minister Barbara Creecy, Minister of Forestry, Fisheries, and Environmental Affairs, will lead with purpose and execute decisions in good time. Once regulatory certainty is provided, this should unlock opportunities within, among others, the plastic, organics, electronic, and construction and demolition waste sectors.

There has been no finalised illustration of the national shift in the amount of waste away from landfill over the last decade, but the general understanding in the sector is this has been the case. According to the outdated 2011 national waste information baseline (NWIB), South Africa generated ~108 million tonnes of waste in 2011. The 2011 estimate indicates that 10% of the total waste stream is being recycled, with the remaining 90% being landfilled. A 2017 draft update has been made available by the national Department of Environment, Forestry and Fisheries, as part of the first State of Waste Report, currently in draft format itself. Although the State of Waste Report has not been finalised, its draft does illustrate healthy growth in waste diversion in the country.

Private sector investments have grown in number and scale; public sector material recovery

investments are entering local municipal budgets; positive regulatory reforms continue to be considered; and the scope of industry organisations have expanded and are likely to expand further through the potential implementation of Extended Producer Responsibility (EPR). Furthermore, growing global and local public concerns about the effects of plastic pollution on the environment has put an immense pressure on brand owners and retailers to align with local and global agreements that seek to divert waste from landfills and the environment, including supporting the supply and demand of recycled material.

As a result of these and other factors, the South African waste economy continues to see a growing interest in the uptake of alternative waste treatment solutions and associated value chains. This has resulted in continued and increasing diversion of waste from landfill, both within the Western Cape and the rest of South Africa. This is likely to accelerate in the next three to five years.

The main drivers of growth in waste landfill diversion and beneficiation include:

- increased awareness by the public and politicians of the impact of waste on the economy, environment, and society;
- extensive support from Producer Responsible Organisations (PRO) and industry associations;
- regulatory reforms (national and provincial);
- increased pressure on municipal landfill airspace;
- a growing understanding by policy makers of the value of waste;
- industry-led voluntary agreements to reduce waste generation and disposal; and
- recognition by government that the waste economy creates jobs and attract investments⁴.

⁴ As illustrated through the Chemical and Waste Operation Phakisa

		Collection	
		Local Municipalities	Private sector
Generation	Household	Local municipalities are constitutionally mandated to ensure that household waste is collected. They can either provide the collection 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 open to households.
	Commercial / Industrial	Local municipalities are not obligated to service commercial/ industrial waste generators. However, the latter may ask local municipalities to collect waste, thereby incurring a service fee.	Commercial and industrial waste generators are responsible for the management of their own waste, including safe disposal. This is usually outsourced to private waste management enterprises.
Treatment / Disposal		Municipalities are mandated to ensure the availability of disposal facilities (landfills). They can support alternative waste treatment by means of providing material recovery and aggregation infrastructure. Such facilities can be managed by the municipality itself, 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, or disposal facilities.

Figure 1: Waste collection and treatment responsibilities in South Africa

2.1. Sector structure

South Africa's waste sector comprises the public sector, private sector, and households. Recycling industry associations and PRO support their respective sectors. Figure 1 shows the relationship between sectors, and their legal roles and responsibilities.

2.1.1. Public Sector

All three spheres of government are responsible for waste management in South Africa. In general they are also responsible for upholding the requirements of the Constitution and the National Environmental Management: Waste Act (NEMWA) (Act 59 of 2008), including related regulations.

National

The national Department of Environment, Forestry and Fisheries (DEFF), previously the Department of Environmental Affairs (DEA), is the overarching authority for waste management in

South Africa, and is the licensing authority for hazardous waste treatment activities.

Provincial

Provincial environmental authorities are generally responsible for regulating waste management. Their functions include:

- promulgating provincial legislation;
- providing municipal support; and
- monitoring municipal and private sector activities.

The Department of Environmental Affairs and Development Planning (DEA&DP) is the Western Cape's provincial regulating authority for waste management.

Waste generators and handlers triggering certain thresholds stipulated in the National Waste Information Regulations (R. 625 of 2012) must register with and report waste figures to either the national DEFF, through the South African Waste Information System (SAWIS)⁵; or a provincial waste information system, if one is available. There are two provincial waste management information systems in South Africa: In the Western Cape, the Integrated Pollutant and Waste Information System (IPWIS) is managed by DEA&DP. The Gauteng waste information system (GWIS) is managed by the Gauteng Department of Agriculture and Rural Development.

Investors and businesses developing / expanding waste initiatives that require a waste management licence (see Section 3.1) must apply for the licence through a provincial environmental authority if general waste is handled. Hazardous waste applications must go through the national DEFF, with provincial environmental authorities engaged as a commenting authority. Engagement with provincial authorities should be undertaken prior to initiating any licencing applications to ensure clarity in the process, or to confirm whether it is needed.

However, the NEMWA and the 2011 National Waste Management Strategy (NWMS) require local municipalities to implement alternative waste treatment in order to divert waste from landfill and to minimise environmental degradation. In some cases, municipalities provide infrastructure for aggregation (drop-offs) and the separation (material recovery facilities), rather than providing the actual recycling infrastructure. These facilities are either operated by the municipality or outsourced to the private sector.

The private agricultural, commercial and industrial sectors are responsible for managing their own waste streams. They are bound by various regulatory requirements, whether they are waste generators, and/or waste handlers:

Municipalities are constitutionally mandated to provide waste collection, removal, storage, and disposal of waste generated by households within their boundaries. Collection can be done by local municipalities or be outsourced to the private sector.

Local municipalities

Local municipalities are not required to provide the private sector with waste collection services. Municipalities are also expected to provide waste collection and disposal infrastructure. Although alternative waste treatment is not explicitly required by the Municipal Systems Act (MSA) (32 of 2000), it is considered in the Act to be a municipal support activity (National Treasury 2008).

2.1.2. Private Sector

Waste generators

Waste generators are responsible for the management of their own waste. This can either be outsourced to private service providers, or to the local municipality on request. Both options will incur a service fee. Private service providers are incentivised to explore alternative waste treatment as the cost of landfilling increases. In general, municipalities are not involved with hazardous waste collection from the private sector.

Waste handlers

Waste management service providers are responsible for the provision of responsible waste management services to their clients, or as contracted to do so by local municipalities.

Investors seeking access to waste streams find it more convenient to work with the private sector and their service providers rather than with municipalities, as the former have fewer procurement requirements with which to comply.

⁵ SAWIS is South Africa's national waste reporting system established in terms of section 60 of the NEMWA

Section 76 to Section 78 of the Municipal Systems Act (32 of 2000) outline the key steps needed before municipalities are able to partner with the private sector. The National Treasury has developed a public private partnership (PPP) manual⁶ to guide the public and private sector through the various phases regulating PPP project cycle for national and provincial government.

2.1.3. Households

Households are generally serviced by their local municipalities, or by the private companies contracted by municipalities to collect waste. Some municipalities⁷ 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 local municipality (unless the municipality has a recycling collection service), contracting an accredited waste service provider, or delivering the recyclables at a licensed facility. Voluntarily contracting of the private sector is common at households in metropolitans and large cities.

2.1.4. Recycling industry associations

South Africa's recycling sector is driven by industry, and supported by industry-funded associations. Broadly speaking, the mission of the associations is to ensure that waste materials are diverted from landfill (supply), and to ensure market development (demand).

Each association promotes the recovery and recycling of materials at different points of the value chain. However, there are no regulated distinctions between the roles and responsibilities of the different industry associations.

South Africa has a number of industry associations that focus on mainstream dry recyclables, e-waste, and organics.

Each of the associations provides varying levels of support to their members along the respective value chains. See Table 1 for a list of active industry associations, and Annexure C for association details.

Membership and financial contributions to these associations have been voluntary. However, at the time of writing this MIR, there were processes in place to implement mandatory extended producer responsibility through adherence to Industry Waste Management Plans (IndWMPs) (see Section 3.2). However, this process has been withdrawn and a new process of EPR is expected to be discussed in 2020.

Investors or businesses who intend to enter the paper and packaging, e-waste, or lighting recycling sectors should engage with the relevant PROs (once designated), or in the interim with the industry associations.

2.1.5. Informal waste collectors

South Africa's informal waste sector plays a principal role in waste diversion (in particular of post-consumer recyclables) from landfill. However, in most cities and towns in South Africa, informal waste pickers operate at the fringe of formal management systems.

The full extent of the importance of the informal waste sector is not fully understood, due to the nature of the informality. For this reason, a number of researchers in South Africa are investigating the contribution, challenges and needs of the informal waste sector. Country-wide surveys are being undertaken. Furthermore, a consortium of researchers⁸ have embarked on a national survey of specifically buyback centres, as the key integration point between the formal and informal sectors in South Africa. These insights will provide a firmer evidence base to guide the integration of the informal sector into formal waste management.

Further to research, the integration of waste pickers into municipal waste collection services will be a requirement for municipalities under the draft NWMS (2019) strategic objective, "Separate waste at source". It is likely that all metropolitan municipalities will be required to have integration programmes in place by 2021, with compliance of secondary cities by 2023. The DEFF and DSI are funding the development of a guideline for the integration of the informal and formal waste sectors for publication in 2020.

2.2. Size of the South African waste sector

At the time of publication of this MIR, the national DEFF had yet to finalise and subsequently publicise South Africa's first State of Waste Report (SoWR). This report is expected to include an update to the 2011 national waste information baseline (NWIB). The draft SoWR⁹ was made available for public comment in May 2018. GreenCape acknowledges that a finalised report may lead result in a number of changes and as such, we have chosen not to report on the draft numbers presented. Although the publication of

the SoWR will be the most current source of information for decision makers developing plans and policies concerning waste, it will be almost two years out of date. There are a range of sources and extrapolated figures that investors can draw upon to better understand the size of the South African waste sector. These are discussed below.

2.2.1. Department of Environment, Forestry and Fisheries (DEFF) national waste information baseline and extrapolated figures for 2016

According to the 2011 NWIB, South Africa generated approximately 59 million tonnes of general waste, 48 million tonnes of unclassified waste, and 1 million tonnes of hazardous waste, a total of 108 million tonnes in 2011 (DEA 2012). Only 10% of all waste was recycled, with 90% landfilled¹⁰. GreenCape, and key sector experts, expects that the final SoWR will show increased diversion and a sizable increase in recycling rates. Figure 2 shows a breakdown of waste types as a percentage of total waste as per the 2011 NWIB.

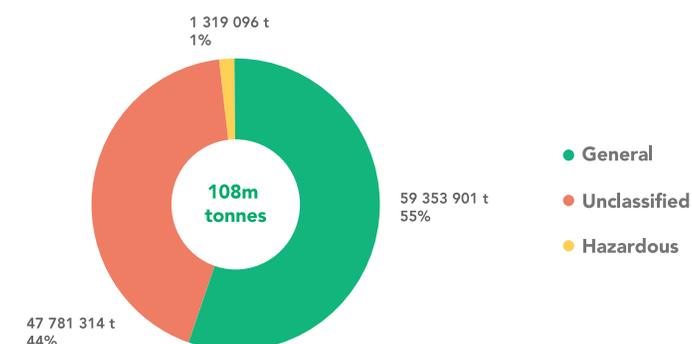


Figure 2: Classification of total waste generated in South Africa in 2011

Source: (DEA, 2012)

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

In 2014, the national Department of Science and Technology (DST) 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 13 identified waste streams¹¹ could be benefited. If the amount of industrial waste going to landfill was reduced by 20%, and domestic waste by 60%, it would unlock R9.2 billion in resource value to the economy.

⁶ www.gtac.gov.za/Publications/1160-PPP%20Manual.pdf

⁷ Only the City of Johannesburg requires mandatory separation at source, apart from households. This is being rolled out in a phased manner.

⁸ Co-ordinated by the DSI and National Research Foundation's South African Research Chair Initiative on Waste and Society based at the University of the Western Cape

⁹ The Draft SoWR can be found at <http://sawic.environment.gov.za/?menu=346>

¹⁰ This does not take into account leakage, e.g. materials that enter oceans or are exported and are effectively 'lost' from the accounting system.

¹¹ 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.

Industry association data

South Africa's dry recyclable sector is well supported by industry-driven associations. Table 1 shows active industry associations and stream-specific estimates tonnages generated and diverted as reported by industry annual reports and engagements with industry associations. The table also provides estimated tonnages available for each material for the Western Cape¹².

Table 1: Recyclables processed and available in 2018 as reported by associations

Material	Association	Material in Circulation (Virgin / Recyclate) (Tonnes)		Collected / Diverted from Landfill		Available for Recycling (Tonnes)		
						South Africa	Western Cape	
							Pop - GDP	
Tonnages	Percentage							
Plastics	PET (Beverage Bottles)	Petco	157 760	232 000	98 649	63%	59 111	6 857 - 8 044
	PET (Thermoform/Edible oil)		74 240		0	0%	74 240	8 612 - 10 103
	LDPE	Polyco	332 163	608 972	162 232	49%	169 931	19 713 - 23 125
	HDPE		133 435		63 888	48%	69 547	8 068 - 9 464
	PP		143 374		47 536	33%	95 838	11 118 - 13 042
	PVC	SAVA	12 937		1 236	10%	11 701	1 357 - 1 592
	PS	PASA	34 023		4 316	13%	29 707	3 446 - 4 043
Fibre	Paper	RecyclePaperZA	952 739		530 807	56%	421 932	48 946 - 57 420
	Cardboard		1 160 204		971 370	84%	188 834	21 906 - 25 698
Glass	TGRC	770 412		631 738	82% ¹²	138 674	16 087 - 18 872	
Metal	Cans	MetPac	162 000	217 000	164 486	76%	52 514	6 092 - 7 146
	Closures		18 000					
	Drums / Pailes		37 000					
E-Waste	EWASA (2017)	360 000		45 000	13%	315 000	36 541 - 42 868	
	SAEWA (2015)	320 000		45 000	14%	275 000	31 901 - 37 424	

Sources: Recent industry association annual reports, IndWMPs, and direct engagements during 2019

¹² The two extrapolations are based on: the proportion of the population of the Western Cape compared to the other provinces, and the nominal output of the Western Cape compared to the other provinces.

¹³ 82% refers to the reuse and recycling (cullet) of glass

2.2.2. Household separation levels

The availability and quality of waste, particularly post-consumer streams, are dependent on the level of material separation done by households. This in turn is linked to demographics and "recycling culture". Broadly speaking, higher separation levels are more common in provinces with larger urban populations. Figure 3 and Figure 4 respectively show the degree of household material separation per province and metropolitan municipality. Based on 2015 data, the Western Cape (20.3%) and the City of Cape Town (CCT) metropolitan area (23%) have the highest rates of household separation (StatsSA 2018).

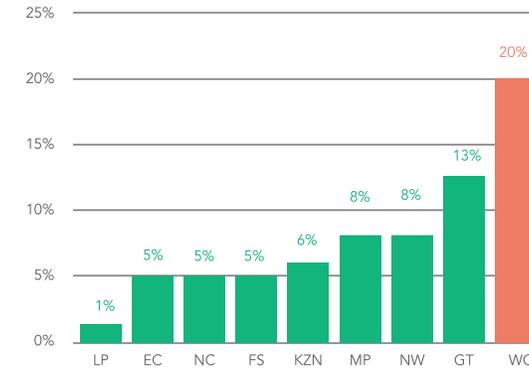


Figure 3: Household separation by province (2015)

Source: StatsSA (2018)

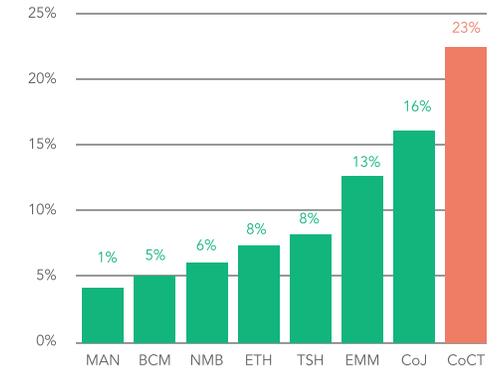


Figure 4: Household separation by metro (2015)

Source: StatsSA (2018)

2.3. Size of the South African waste sector

The Western Cape generated ~7.7 million tonnes of waste in 2015 (DEDAT, 2016). The province's waste comprises mostly municipal solid waste (MSW), and agricultural waste and residues. This is to be expected, as much of the Western Cape's economy is driven by agriculture and tertiary services. As a result, much of the waste generated will be characterised by dirty mixed waste streams and large volumes of organic residues. Table 2 and Figure 5 show the tonnages generated in the Western Cape. Annex A provides detailed waste distribution figures by metro and district municipality.

Table 2: Total waste tonnages generated per district municipality / metro in 2015

Municipality	Municipal Solid Waste	Agri / Forestry Residues	Construction / Demolition	Commercial / Industrial	Other	Total
City of Cape Town	1 671 146	66 885	1 090 995	637 419	247 248	3 713 693
Cape Winelands	286 482	304 734	272 749	98 976	49 489	1 012 430
Central Karoo	23 874	34 531	17 047	4 308	4 334	84 094
Eden	190 988	501 013	153 421	70 344	34 865	950 631
Overberg	95 495	540 887	85 234	30 540	15 905	768 061
West Coast	119 368	917 734	85 234	39 514	23 544	1 185 394
Western Cape	2 387 353	2 365 784	1 704 680	881 101	375 385	7 714 303

Source: DEDAT (2016)

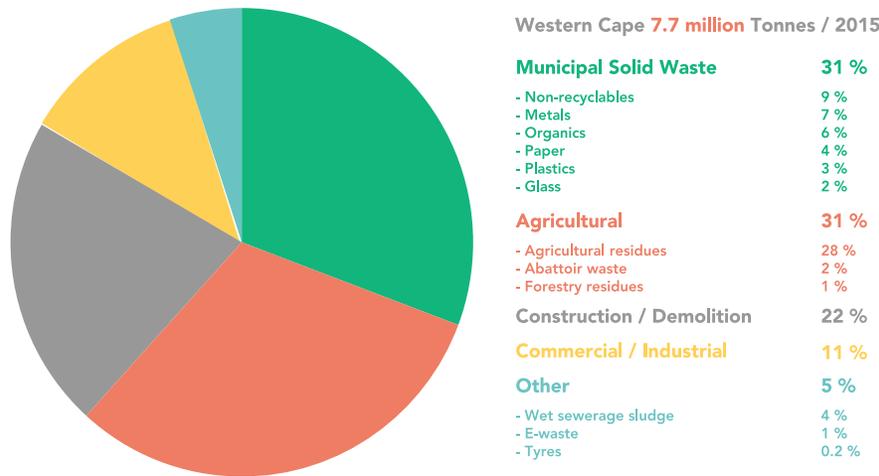


Figure 5: Western Cape waste characterisation in 2015

Source: DEDAT (2016)

Commercial and industrial waste streams are popular with private sector solution providers. Private sector waste is often:

- continuous, homogenous, and found in large volumes;
- less contaminated and easier to separate at points of generation; and
- easier to access from a contractual/ procurement perspective.

It is easier to motivate commercial and industrial generators to look for alternative solutions as it reduces their disposal overheads.

The agriculture and forestry sector generates large volumes of clean homogenous waste streams. However, agricultural waste is often

misrepresented as waste, and its re-entry into other points of the agricultural value chain, albeit not in its intended form, is often not considered. Nevertheless, it is a sought-after stream that, because of logistical constraints, is often processed in close proximity to generation.

Although Municipal Solid Waste (MSW) is the largest waste stream in the Western Cape, it is the hardest stream to which value can be added. This is mainly due to contamination, and depends on who the owner of the stream is. Table 3 shows the breakdown of total MSW generated per Western Cape district / metropolitan municipalities for 2015, and the extrapolated tonnages for 2019 and 2023, based on the expected population growth only.

Table 3: MSW generated per district municipality/metro in 2015, 2019 and 2023

Municipality	Area (km ²)	Population		MSW (Tonnes) ¹⁴				
		2019 (estimated)	Growth since 2015	2015 (actual)	2019 (estimated)			2023 (estimated)
				Total	Total	Per Person	Per ¹⁵ km ²	Total
City of Cape Town	2 446	4 420 471	10%	1 671 146	1 833 216	0,415	749	1 915 036
Cape Winelands	21 473	906 240	9%	286 482	311 814	0,344	15	325 260

¹⁴ This year's MIR has separated C&D waste from the MSW as this stream has been separated at landfills
¹⁵ Please note that the number used in the 2019 MIR to represent the tonnes per km² was incorrectly based on the number of people per km².

Central Karoo	38 854	72 325	3%	23 874	24 521	0,339	1	24 798
Eden District	23 331	615 049	5%	190 988	199 907	0,325	9	204 817
Overberg	12 239	296 172	9%	95 495	104 071	0,351	9	108 768
West Coast	31 119	450 304	10%	119 368	130 715	0,290	4	136 283
Western Cape	129 462	6 760 561	9%	2 387 353	2 604 242	0,385	20	2 714 961

Source: Extrapolated from DEDAT (2016) and Quantec (2019)

The CCT metropolitan area, which is the only metropolitan municipality in the Western Cape, generates more than 70% of the waste in the Western Cape. The most recent waste characterisation study was undertaken in 2018.

Figure 6 shows that 31% of all waste was made up

of non-recyclables such as textiles, residual, construction, wood, and what is termed as "other". See Annex B for a detailed breakdown of the CCT metropolitan area's waste as per the waste characterisation study.

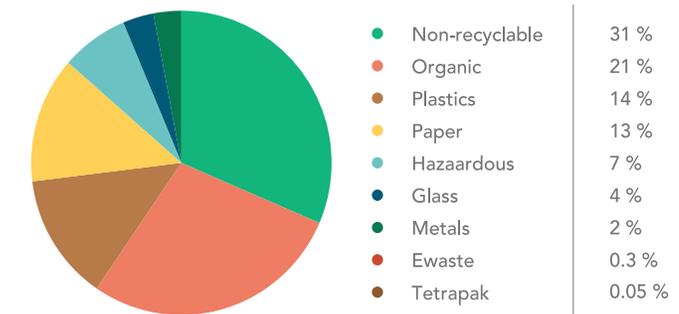


Figure 6: Waste characterisation for the CCT metropolitan area

Source: CCT (2018)

2.4. General drivers for waste beneficiation

2.4.1. Increasing cost of landfill disposal

The cost of landfill disposal (the gate fee charged per tonne) continues to be relatively low in South Africa compared to benchmarks in more developed economies. In spite of this, waste

generators still regard landfilling as a costly overhead, especially in the Western Cape. Figure 7 shows landfill gate fees for general waste across all of eight of South Africa's metros.

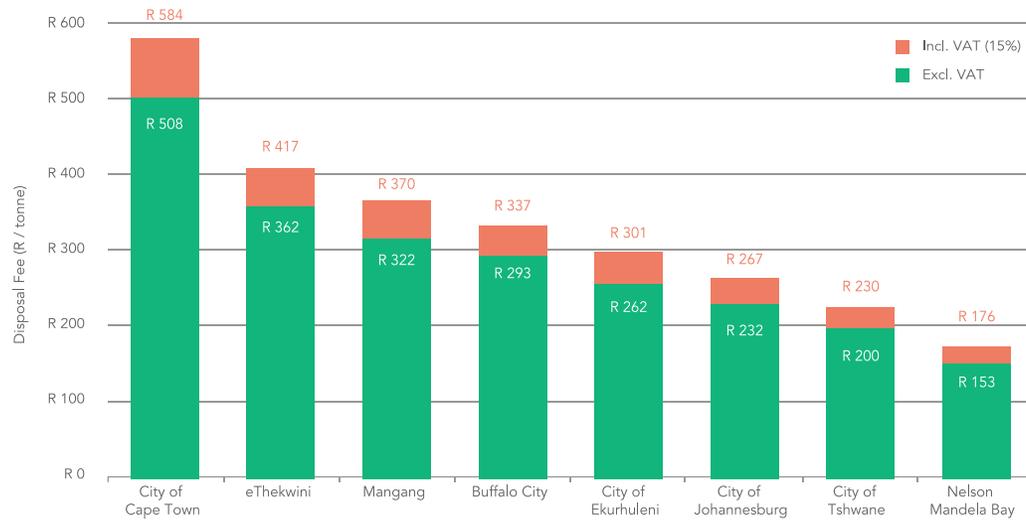


Figure 7: Land fill gate fees for general waste for South Africa's eight metros for 2019/20

The CCT metropolitan area has the highest landfill gate fees in the country. Figure 8 shows the rise in gate fees in the metro since 2012/13, and expected increases up to 2021/22 based on the CCT planned budget. As the cost of landfill disposal increases above inflation¹⁵, the

increasing overheads for waste generators should strengthen the business case and reduce the risk for investors / businesses looking to invest / provide alternatives to landfill solutions to businesses based in Cape Town.

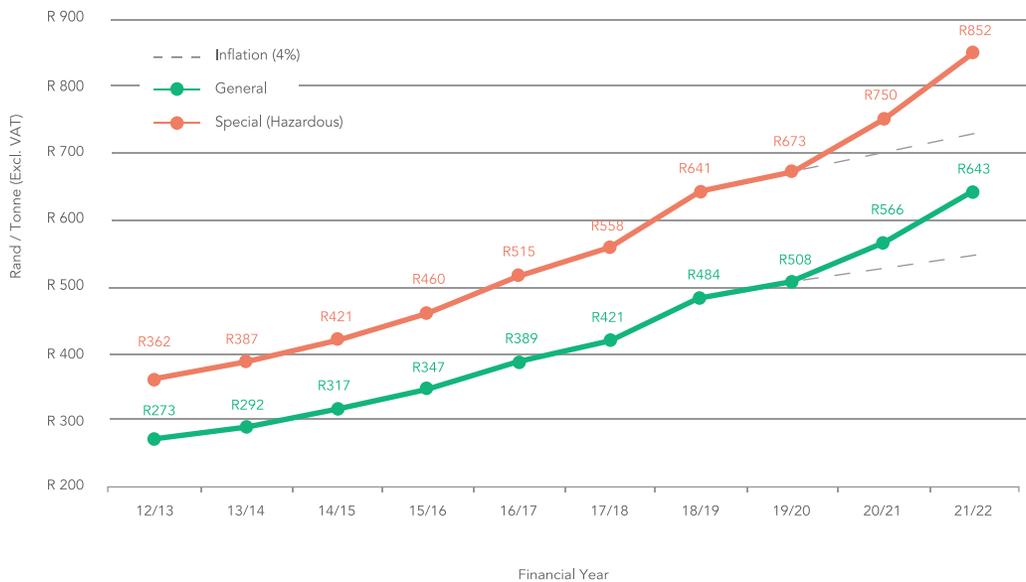


Figure 8: Landfill gate fees (excl. VAT) for the CCT metropolitan area (2012/13-2021/22)

Source: GreenCape and City of Cape Town (2019a)

¹⁶ Inflation was 4% on 22 January 2019 (www.Tradingeconomics.com)

It should be noted that although the cost of landfilling in the CCT metropolitan area is expected to increase by 11.5% and 13.50% over the next two years, the cost of refuse collection from households and businesses is expected to increase by only 6% over the same period. This suggests a higher reliance on the landfill disposal fees for revenue generation.

The national DEFF aims to implement mechanisms under its own control to fast track landfill diversion. This includes plans for the implementation of a landfill tax, which will increase overall disposal cost across the country. This is still being assessed, along with an adequate tax rate. Such additional overheads to waste generators may further increase the business case for alternatives to landfill solutions.

2.4.2. Reduction of landfill airspace

Old landfills are closing, existing landfills are increasingly expensive to operate and maintain, and the cost and sighting of new landfills have been challenging. However, the Western Cape is not a homogeneous entity. Some municipalities are in a more serious situation than others. Figure 9 shows the estimated lifespan of the Western Cape's municipal landfills as of 2019, and the location of intended regional landfills.

The Western Cape, like many parts of South Africa, is currently grappling with the availability of suitable landfills for disposal.

Although it is likely that many of the metros are able to handle current waste disposal rates, the lack of availability for surrounding local municipalities will more than likely result in the movement of waste between municipalities. This would affect the expected lifespans of metro landfills. As such, metros and local municipalities greatly affected by the lack of airspace will more than likely be investigating waste diversion initiatives and waste treatment technologies.

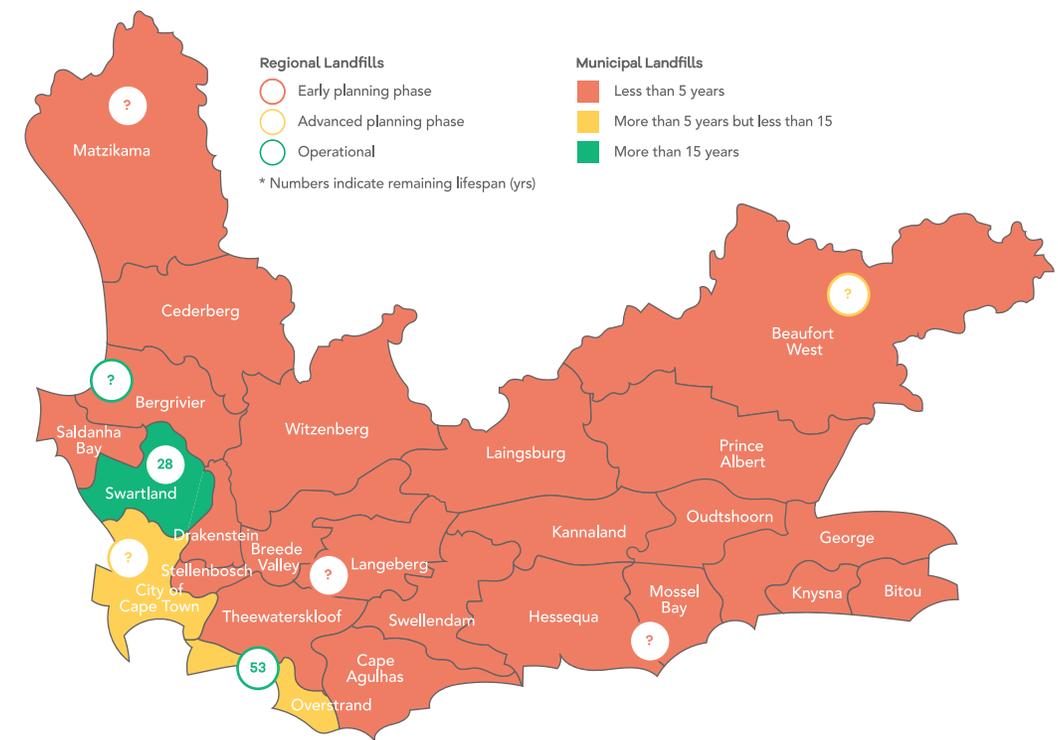


Figure 9: Estimated landfill lifespan for each local municipality in the Western Cape

Source: Extrapolated from DEA&DP (2019)

The Western Cape does have privately owned and operated landfills. However, only Vissershok private landfill¹⁶ (next to Vissershok Municipal Landfill) operates as a commercial landfill receiving waste from businesses and municipalities. Furthermore, there are three existing and six proposed regional landfills to serve not only one local municipality, but multiple municipalities.

2.4.3. Perceived job creation in waste

In 2017, the then national DEA undertook its Operation Phakisa: Chemicals and Waste Economy. During this session, the DEA identified 20 initiatives across four work streams to divert 20 million tonnes of waste from landfill. If realised, these initiatives were estimated to be able to unlock an additional R11.5 billion per year to help create 45 000 direct and 82 000 indirect jobs, and 4 300 small, medium and micro-sized enterprises (SMMEs). This has resulted in the now DEFF's active role in regulation reform (see Section 3), industry SMME support, and investment into supporting landfill diversion infrastructure. See Section 2.6 for more details on Operation Phakisa.

2.5. General risks and barriers

2.5.1. Extracting value from MSW

It is difficult to extract value from municipal solid waste (MSW) due to its complex nature and depending who the owner of the waste is. Firstly, MSW is constitutionally managed, and thus "owned", by local municipalities. This makes access to the waste onerous due to municipal procurement processes. Secondly, MSW is essentially a mix of general household articles, which include general and hazardous waste, all of which come in various quantities and ratios, and all of which can be substantially contaminated.

2.5.2. Low levels of separation at source

Generally speaking, South Africans do not have a culture of separating waste at source. This makes extracting value difficult and costly. Regarding households, there are no incentives / disincentives for households to separate at source. Households pay for waste management through municipal rates and tariffs. These rates are required to be paid irrespective of households diverting waste or not. Secondly, apart from the City of Johannesburg, there are generally no strictly mandated requirements for households to separate at source. Even if municipal waste

management by-laws require mandatory separation at source, municipalities do not always have the capacity to enforce this. However, generally, it makes financial sense for the private sector to separate and divert waste to reduce landfill disposal overheads.

2.6. Industry highlights from 2019/2020

New national environmental leadership

June 2019 saw the newly elected President of South Africa, Cyril Ramaphosa, consolidate a number of ministries. This included the Department of Environmental Affairs (DEA) whose mandate included waste. This ministry has since been combined with the Department of Forestry and Fisheries to form the Department of Environment, Forestry and Fisheries (DEFF). Ms Barbara Creecy has taken over as minister from Ms Nomvula Mokonyane, whilst Ms Maggie Sotyu has replaced the deputy ministers. Ms Nosipho Ngcaba continues her role as Director-General, and so too does Mr Mark Gordon as Deputy Director-General of Chemicals and Waste Management. Mr Gordon is the key contact for waste in South Africa.

Final State of Waste Report delayed

At the time of writing this MIR, the DEFF was still in the process of finalising the State of Waste Report (SoWR), which includes an update to the 2011 national waste information baseline (NWIB). The SoWR will be the most current source of information for decision makers to develop plans and policies about waste. The report was expected to be finalised and released in mid-2019. Although the draft report has been made available, many industry experts prefer to wait for the final report before they start using it.

Updated National Waste Management Strategy

South Africa's 2011 National Waste Management Strategy (NWMS)¹⁷ is currently being revised and updated. The NWMS is a government-wide strategy that applies to all organs of state responsible for waste management, the private sector, and civil society. The draft update was released for public comment at the time of writing this MIR, with the comment period ending late February 2020. Together with the updated SoWR, this should inform South Africa's waste management trajectory going forward.

Municipal infrastructure support for recycling

Various municipalities in the Western Cape are making sizable investments into supporting the diversion of waste from landfill to value-add solutions. Table 4 illustrates the major solid waste related infrastructure to be developed in the

Western Cape over the coming years. Although a great deal of investment will be going into landfills to mitigate risk in meeting basic service delivery and regulatory requirements, there is also much investment going into material extraction. Such investments should increase the availability of material for recyclers.

Table 4: Major waste infrastructure developed in the Western Cape in the medium term

Munic / Metro	Description	Expected Spend (2019/20 – beyond)	
CCT	Helderberg Drop-off (Design and Develop)	R763 300 000	
	Prince George Drop-off (New)		
	Athlone Material Recovery Facility / Mechanical Biological Treatment (Phase 1)		
	Coastal Park Material Recovery Facility (Design and Develop)		
	Helderberg Material Recovery Facility		
	Beneficiation / Value Extraction	Athlone Material Recovery Facility / Mechanical Biological Treatment (Phase 2)	R937 600 000
		Vissershok South Landfill Gas Infrastructure to Flaring	
		Coastal Park Landfill Gas Infrastructure to Electricity	
	Disposal / Landfill	Coastal Park: Design and development of landfill airspace	R645 500 000
		Vissershok North Design and Develop Airspace	
Vissershok South Design and Develop Triangle Airspace			
Kalbaskraal Regional Landfill Site (land purchase)			
Kalbaskraal Regional Landfill Site (Develop)			
Stellenbosch	Recovery / Separation	R22 000 000	
	Beneficiation / Value Extraction	Landfill Gas To Energy	R5 800 000
		Waste to Energy - Planning	
		Waste to Energy - Implementation	
	Disposal / Landfill	Waste Biofuels	R47 000 000
Transfer Station: Stellenbosch			
	Expansion of the landfill site (New cells)		

Source: Municipal medium term 2019/20 budgets

¹⁷ The 2011 NWMS can be found at www.environment.gov.za/documents/strategicdocuments/wastemanagement

Table 4: Major waste infrastructure developed in the Western Cape in the medium term (continued)

Munic / Metro	Description		Expected Spend (2019/20 – beyond)
Drakenstein	Recovery / Separation	Material Recovery Facility (Wellington)	R5 500 000
		Mini Drop-off construction	
	Beneficiation / Value Extraction	Biogas Plant Construction	R1 500 000
	Disposal / Landfill	Hermon Satellite Transfer Station – Upgrade	R1 000 000
		Landfill – Design	
Height extension (Wellington)			
Overstrand	Recovery / Separation	Hermanus New Waste Management Facility	R20 300 000

Source: Municipal medium term 2019/20 budgets

Stellenbosch runs out of airspace

As it stands, Stellenbosch local municipality has run out of landfill airspace. As one of the largest municipalities (by GDP and population), the municipality is currently transporting its waste to Cape Town based landfills. Although the municipality has invested in expanding its existing Devon Valley landfill, this is only a temporary solution. The municipality has made investment in both dry- and wet-waste diversion initiatives.

Chemical and Waste Operation Phakisa update

In July and August 2017, the then DEA hosted a five-week Chemical and Waste Economy Phakisa. This meeting of industry was convened to discuss the state of waste in South Africa and to identify key working areas for industry on which to focus its attention. This resulted in 20 initiatives. In July 2019, the now DEFF held an alignment workshop which resulted in a number of updates. At the time of writing this MIR, these initiatives had yet to be signed off by the Minister of Environment, Forestry and Fisheries. Table 5 provides a description of the 20 initiatives, coupled with job creation potential, potential GDP contribution, and waste diversion potential as calculated in 2017. The table also provides the key DEFF contacts responsible for delivering the initiatives.

Table 5: Descriptions of the 20 Phakisa initiatives, including key contacts

Theme	Initiative	Jobs created (est)	GDP contribution (est)	Waste diverted (est tonnes per year)	Key DEFF Contact	
Bulk industrial waste	Ash, slag and gypsum	1 Increase ash uptake for alternate building materials	R7.4 billion	10 300 000	Suprize Zwane	
		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	Mpho Morud

Source: DEA (2017) and DEFF (2019)

Table 5: Descriptions of the 20 Phakisa initiatives, including key contacts (continued)

Theme	Initiative	Jobs created (est)	GDP contribution (est)	Waste diverted (est tonnes per year)	Key DEFF Contact	
Municipal	E-waste	6 Introduction of an e-waste levy to increase collection rate	21 000 (Indirect)	R1.2 billion	3 700 000	Thabo Magomola
		7 Unlocking government ICT legacy volumes				Kagiso Mokone
	Mixed	8 Achieving minimum of 50% of households separating at source by 2023				Mamagala Musekene
		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				Dumisani Buthelezi
Product design and waste minimisation	Food	11 Developing capacity through a specialised programme that upsills agri-stakeholders to minimise food loss	287	R1.2 billion (loss avoided)	245 000	Rishal Sooklal
		12 Consumer awareness campaign to use and consume ugly food				
	Packaging	13 Compilation/update of packaging design guidelines	2 464	R36 million	146 000	Kagiso Mokone
		14 Formalising the packaging industry producer responsibility plans				Anben Pillay
Refuse Derived Fuel	15 Establish refuse derived fuel plants across South Africa	305	R80 million	120 000	Surprise Zwane	
Chemicals	Harmful chemical imports	16 Establish a refrigerant reclamation and reusable cylinder industry	2 000 (Direct)	R540 million	225 000 cylinders	Lubabalo Maweni
		17 Ban import of harmful chemicals, e.g. leaded paint/paint pigments	1 000 (Indirect)			Gordon Khaue
	Dangerous chemical stock-piles	18 Collect and dispose stockpiles of harmful substances (asbestos, mercury)	NA	NA	NA	Mishelle Govender
SMME development	19 Coordinate SMME development opportunities across initiatives				Budu Manaka	
Awareness	20 Roll out national awareness campaigns				Dumisani Buthelezi	

Source: DEA (2017) and DEFF (2019)

Green Building Council of South Africa's Net Zero Waste Certification

The Green Building Council of South Africa (GBCSA) has launched a net zero waste certification. This certification¹⁸ can be applied to both new and existing / operational buildings. There are two levels of certification. Level one covers the construction phase, and level two covers the operational phase. To waste certification category covers a building that reduces, reuses, and recovers its waste streams to convert them to valuable resources with zero solid waste sent to landfills over the course of the year (Net Zero), or where the building can take waste from other sites and divert it for reuse, and not to landfill (Net Positive).

From Industry Waste Management Plans to Extended Producer Responsibility

The Minister of Environment, Forestry and Fisheries has withdrawn a NEMWA Section 28 notice calling the paper and packaging, lighting equipment, and electrical and electronic industries to submit industry Waste Management Plans (IndWMPs). However, the Minister has indicated that she will engage the relevant industries to investigate the implementation of Extended Producer Responsibility (EPR) measure as it is contemplated in Section 18 of the NEWM. Such a decision, although it causes further delays in South Africa's EPR journey, has been positively received by industry leaders.



¹⁸ <https://gbcasa.org.za/certify/green-star-sa/net-zero/>

3 Legislation, regulation, and policy

This section provides a brief overview of major legislation and regulations that govern waste management in South Africa. It also highlights draft and anticipated legislation and regulations that are in the process of development, or likely to be implemented, and likely to have an impact on investments.

South Africa has a vibrant and progressive regulatory framework for landfill diversion of waste, and subsequently waste beneficiation. Over the course of three decades, the regulatory environment has shifted from landfill management to recycling, and recently towards extended producer responsibility. Further regulatory transitions are expected to take place at both a metro/municipal level, and at provincial level in the Western Cape. However, industries have concerns largely about the enforcement of these regulations, particularly for those who transgress municipal by-laws.

3.1. Waste management regulatory framework

In terms of Section 24 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 (107 of 1998)

The NEMA is guided by key integrated environmental management principles with the aim to ensure that negative environmental impacts are prevented, mitigated, and/or regulated. They provide an array of instruments to monitor and manage activities that have an impact on the environment.

One of these instruments 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. The 'Listed Activities' require either a 'Basic Assessment' process or an 'EIA Scoping' process to be undertaken before an activity can be authorised. 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) registered with the Environmental Assessment Practitioners Association of South Africa (EAPASA)¹⁹ to undertake the application.

The EIA regulations do not apply only to general activities, but also include waste management activities that are governed by South Africa's National Environmental Management: Waste Act (NEMWA) (Act 59 of 2008), or more colloquially known as 'the Waste Act'.

National Environmental Management: Waste Act (Act 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. Investors and businesses looking to mitigate any investment risks should take NEMWA into consideration and be aware of its requirements and the ramifications if violated.

¹⁹ www.eapasa.org

NEMWA provides a list²⁰ of waste management activities²¹ that must undergo a waste management licensing process if certain criteria/thresholds are triggered. These activities are deemed to have, or are likely to have, a detrimental effect on the environment.

These waste management activities are differentiated into three categories that have different approval and licensing requirements:

- 'Category A' activities require a basic EIA;
- 'Category B' activities 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.

Category C is an attempt to facilitate the uptake of alternative waste treatment. The DEFF has downgraded certain triggers from Category A to Category C activities. Thus, instead of undertaking an EIA process, certain activities now need only to adhere to norms and standards.

Any waste investments must ensure that waste storage, recycling or recovery, treatment, and/or disposal activities are licenced as per NEMWA's listed activities.

National Environmental Management Air Quality Act (Act 39 of 2004)

The National Environmental Management Air Quality Act (NEMAQA) is an air quality specific act that aims to prevent negative environmental impacts related to air quality. The NEMAQA provides a list of activities, published under Government Notice 893 in Government Gazette 37054 dated 22 November 2013, that trigger the need to undertake an air emission licensing process. The NEMAQA is particularly relevant to waste-to-energy projects. Investors and businesses interested in waste-to-energy activities must consider the NEMAQA, its requirements, and the ramifications if violated.

²⁰ Government Notice 921 National Environmental Management: Waste Act (59/2008): List of waste management activities that have, or are likely to have, a detrimental effect on the environment (as amended)

²¹ Storage, recycling or recovery, treatment, disposal

²² Copy of the CCT's bylaw can be found at <https://openbylaws.org.za/za-cpt/act/by-law/2009/integrated-waste-management/resources/eng.pdf>

Municipal waste management by-laws

Local municipalities may choose to regulate how waste is managed within their boundaries through the promulgation of waste-specific by-laws. These by-laws often provide obligations for both waste generators and waste handlers, including accreditation and reporting obligations. Existing waste 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 to determine whether they need to be registered and/or accredited.

CoCT's by-law (as amended)²² requires that any person intending to perform recycling, reuse or recovery activities, or the sorting of waste, must be accredited before commencing activities. Accreditation requires the submission and approval of an integrated waste management plan to a CCT waste officer.

The DEA&DP is in the process of developing a generic by-law template. The template is aimed at providing local municipalities a blueprint to either adopt in part or in its entirety. This framework is regarded as proactive and provides for separation at source.

Furthermore, the intention of initiative 8 of Operation Phakisa (see Section 2.6) is to promulgate norms and standards for implementation of separation at source into municipal bylaws across the country; these norms and standards are most likely to affect metropolitan municipalities.

3.2. New regulatory updates

A number of regulatory changes have occurred since the publication of the previous 2019 MIR. The following changes are likely to have an impact on the waste investment decisions:

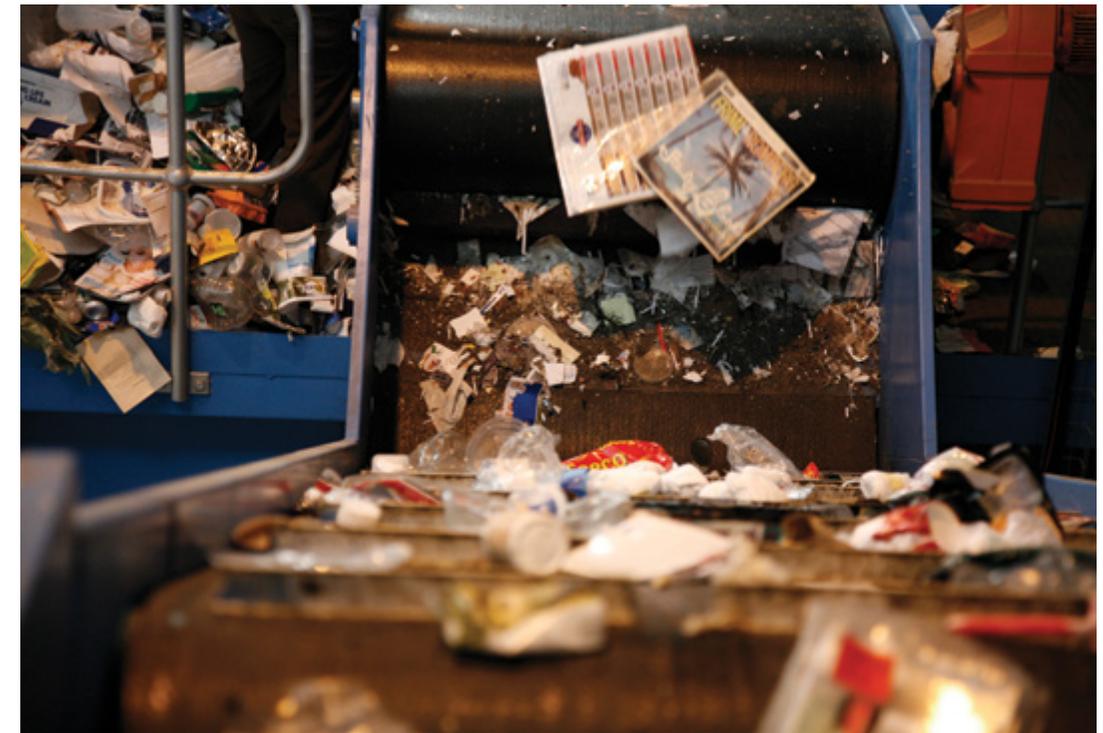
Industry Waste Management Plan notice withdrawn (GN1353 of 2017)

As indicated in Section 2.6, a decision has been made to withdraw the call for IndWMPs for the paper and packaging, lighting equipment, and electrical and electronic industries. The then DEA published a NEMWA Section 28 notice (GN1353 of 2017) on 06 December 2017. The notice required the respective industries to develop and submit plans on how those industries were to manage their waste. Producers²³ were required to prepare and submit an IndWMP to the minister for approval by 06 September 2018, or subscribe to a non-profit producer responsibility organisation (PRO) that will develop and implement an IndWMP. Once the IndWMP is approved by the minister, producers would have had to comply with the requirements of the IndWMP to which they have subscribed.

This process was delayed largely due to the passing of the then Minister of Environmental Affairs, Ms Edna Molewa, coupled with the reshuffling of the national departments and the assessment of the thirteen²⁴ plans. However, at the time of writing this MIR, the Minister of Environment, Forestry and Fisheries made the decision to withdraw the "Section 28" notice (GN1659 of 2019). The decision was made as none of the IndWMP proposals complied with the criteria stipulated in the 2017 Section 28 Notice. This process is now considered closed.

Scheduled landfill restrictions (2019/20)

The national norms and standards for the disposal of waste to landfill (R. 636 of 23 August 2013) provide directives for the disposal of waste to landfill. Included in these norms and standards is a list of waste streams that are prohibited²⁵ from disposal to landfill. These may be streams in which investors would be interested to invest. Figure 10 illustrates the past and future national and Western Cape landfill restrictions.



²³ 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, or goods wrapped in primary or secondary packing material.

²⁴ A total of thirteen plans have been submitted to the DEFF (then DEA) for consideration. This includes seven for the paper and packaging industry, two for the lighting industry and four for the electrical and electronic industry.

²⁵ Chapter 5(1) of Regulation 636 of 23 August 2013 stipulates the prohibitions and restrictions on the disposal of waste to landfill that come into effect after the timeframes indicated for each waste from the date of the Regulations coming into operation.

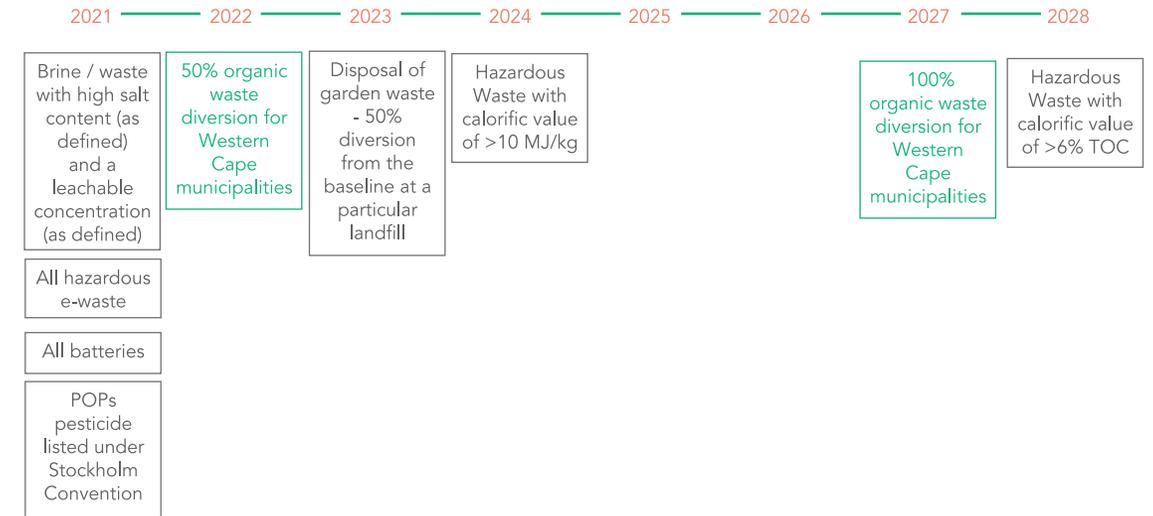
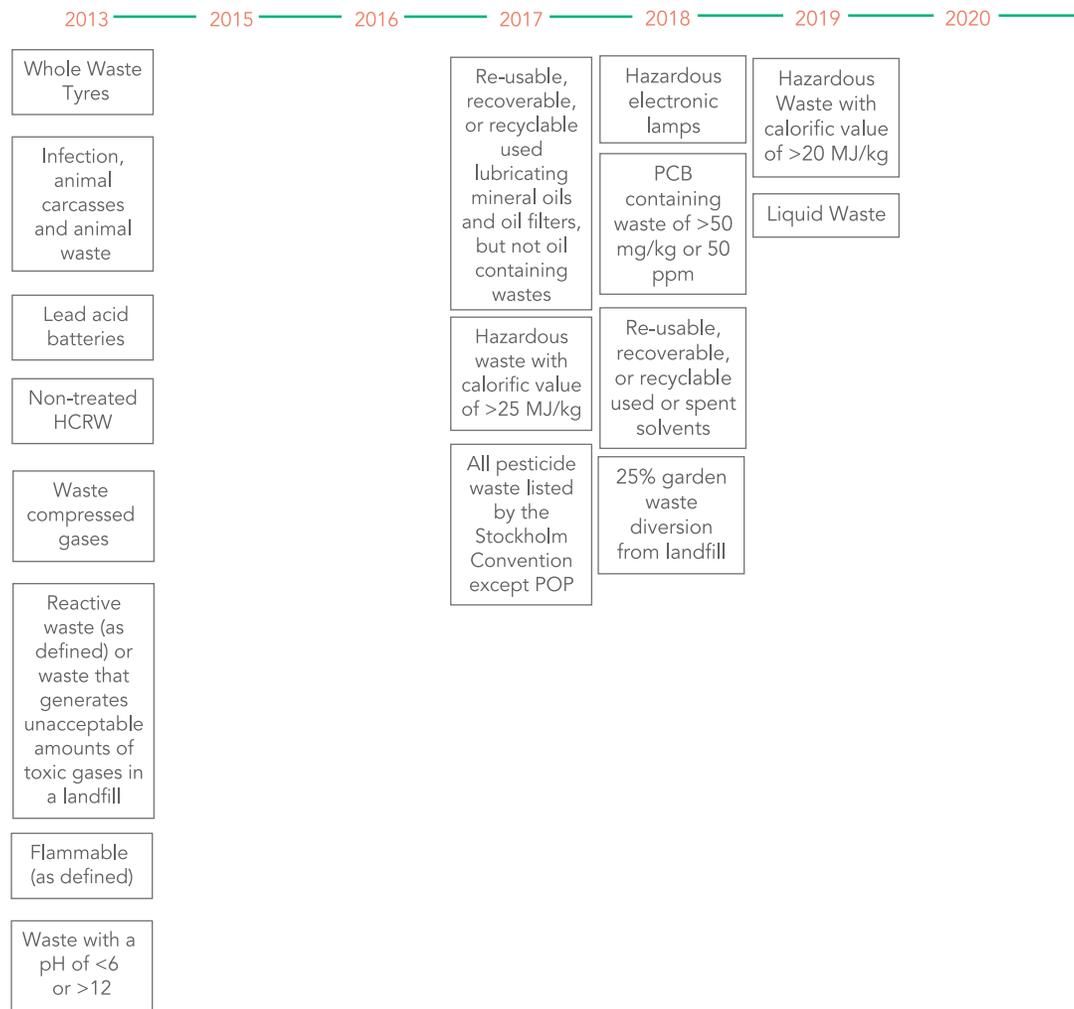


Figure 10: Past and future national and Western Cape landfill disposal restriction

Source: Extrapolated from Chapter 5(1) R. 636 of 23 August 2013

Carbon Tax Act

South Africa's new Carbon Tax Act ([Act 15 of 2019](#)), ratified on 01 June 2019, aims to ensure sustainable economic growth and to meet a number of carbon emission reduction targets, most notably South Africa's obligation to the Paris Agreement. The Act allows the taxation of public and private entities that produce in excess of a prescribed greenhouse gas threshold. The tax will be implemented in a phased manner over 11 years. Phase one runs from 1 June 2019 to 31 December 2022.

The Carbon Tax Act affects the waste sector in four key ways:

- Disposal, biological treatment, and incineration and open burning of solid waste. Wastewater treatment and discharge is excluded from the tax base during the first phase. This is largely due to administrative difficulties in measuring and verifying emissions. This will be reassessed for the second phase in 2023.
- The energy, manufacturing, and construction industries that recover heat and/or electricity from waste are not exempt and are therefore required to adhere to the Carbon Tax Act.
- The Act strengthens the business case for certain waste solutions. It provides offset allowances for heavy GHG emitters looking to reduce their carbon tax liability by purchasing carbon credits from approved²⁶ carbon credit projects. Waste solutions may therefore seek to register their activity with existing international carbon offset standards²⁷ as a carbon credit project and benefit from carbon credits²⁸.
- Increase in fuel prices which will impact on logistics across the waste value chain.

Hazardous Waste Management Activities Register

The DEFF published a notice ([GN541 of 2019](#)) that requires any person who lawfully commenced, undertook or conducted a hazardous waste management activity prior to the coming into effect of the NEMWA is required to apply for a waste management licence with the DEFF within one year of the publication of the notice. Prior to July 2009, waste management activities were

regulated by different environmental legislation such as the Environment Conservation Act (No.73 of 1989) (ECA) and the National Water Act (No.36 of 1998). This has resulted in some confusion regarding the lawfulness of a number of waste management activities currently being conducted. To provide clarity, the Minister of DEFF is implementing Section 82 of the ECA which gives the Minister the power to call on all current lawful users to apply for a waste management licence.

3.3. Anticipated regulations / guidelines

There are several regulations that are in the discussion phase, or that will be promulgated in due course.

Scheduled landfill restrictions (2019- 2021) (R.636 of August 2013)

The national norms and standard for the assessment of waste for landfill disposal ([R.636 of 23 August 2013](#)) provides directives for the disposal of waste to landfill. Included in these norms and standards is a list of wastes that cannot be disposed of at landfill. [Figure 10](#) illustrates the past and future national and Western Cape landfill restrictions.

The following waste streams will be banned from landfilling as of 23 August 2021:

- Persistent organic pollutant pesticides listed under the Stockholm Convention;
- Batteries other than lead acid²⁹;
- Hazardous e-waste other than lamps³⁰;
- Brine as defined; and
- Macro-encapsulation of waste as defined.

Provincial landfill diversion targets for organics
The Western Cape's 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. This will require municipalities to set annual targets, and to identify and implement procedures to meet these targets. This should result in an increased demand for organic waste solutions from both the private sector and municipalities.

Norms and Standards for Separation at Source

To meet its target of achieving a minimum of 50% of households separating at source by 2023, the DEFF's Chemical and Waste Operation Phakisa (see [Section 2.6](#)) will develop and promulgate national norms and standards for separation at source. This initiative also intends to include separation at source into municipal integrated waste management plans and, as a minimum, in all waste management by-laws for South Africa's metros, including the CCT metropolitan area. Proposed date of implementation is the latter half of 2021.

Further to the above, the national DEFF is developing voluntary municipal guidelines for separation-at-source of waste, which was to be finalised in late 2019 to early 2020. These may lead to increased demand for collection of recyclables by private sector contractors and feedstocks for the market.

Extended producer responsibility envisioned (GN1659 of 2019)

Instead of IndWMPs for the paper and packaging, lighting equipment, and electrical and electronic industries, the minister has made the decision to engage the respective industries to investigate implementing extended producer responsibility (EPR) measures. Such an approach is contemplated in "Section 18" of the NEMWA. This provides the Minister of Environment, Forestry and Fisheries, in consultation with the Department of Trade, Industry and Competition (DTIC), the authority to identify a product or class of products, specify the EPR measures to be taken, and identify the person category or category of persons who must implement the EPR measures. Furthermore, the minister is authorised to request specific requirements to be included in the EPR programme. As indicated in [Section 2.6](#), although such a decision will result in further delays in EPR for South Africa, the approach has been welcomed by industry leaders. It is too early to speculate on details of the expected Section 18 notice. It is hoped that the decision will provide easier access to levies to operate the EPR measures.

National Health Care Risk Waste Regulations (GN 463 of 2018)

The draft regulations are intended to regulate the management of health care risk waste (HCRW). These draft regulations provide for general duties

that apply to generators, transporters, and managers of HCRW. Furthermore, the draft regulations propose a set of norms and standards ([GN 464 of 2018](#)) that prescribe minimum requirements for the efficacy testing and operation of a non-combustion treatment technology used to treat HCRW. No indication of its promulgation has been given.

Draft norms and standards for organic waste composting (GN 1135 of 2019)

The national DEFF is in the process of updating the draft national norms and standards for organic waste composting. These draft norms and standards are expected to exempt organic waste composting facilities that process more than 10 tonnes of organic waste a day from needing a waste management licence as required. The purpose of these norms and standards is to provide a "best practice" approach to the composting of organics that prevents / minimises negative impacts on the bio-physical, social and economy environment. The draft norms and standards are only applicable to compostable organic waste, which excludes infectious, poisonous, health-care and hazardous organic wastes.

Exclusion of waste streams from the definition of waste (GN 1077 of 2019)

In 2018, the then Minister of Environmental Affairs published the regulations excluding 'waste stream' from the definition of waste ([GN.715 of 2018](#)). These regulations prescribe the manner in which an application can be made to exclude a waste stream from the definition of waste. During the drafting of the regulations, a number of waste streams were proposed to be excluded from the definition of waste. These streams³¹ were subsequently removed with the promulgation of the regulations. A second list of streams was published in April 2019; however, this list was also withdrawn. The current Minister of Environment, Forestry and Fisheries has since published a notice ([GN 1077 of 2019](#)) inviting public comment on a list of applications received for the exclusion of waste streams from the definition of waste. The notice includes a number of streams that can be broadly categorised as: Ash, Slag, Biomass, and Gypsum. Companies handling these streams and who are applying for exclusion will be seeking solutions to these streams once they have been excluded from the definition of waste.

²⁶ Carbon credits are issued by an independent carbon standard such as the Clean Development Mechanism or Verified Carbon Standard after which they are referred to as Certified Emission Reductions or Voluntary Emission Reduction (VERs)

²⁷ The first phase carbon offset system will rely on the Clean Development Mechanism, Verified Carbon Standard and the Gold Standard.

²⁸ National Treasury has developed an explanatory note for the draft regulation of the carbon offset: www.treasury.gov.za/public%20comments/CarbonTaxBill2018/EXPLANATORY%20NOTE%20TO%20REVISED%20CARBON%20OFFSET%20REGULATIONS.pdf

²⁹ Lead batteries were banned from landfill as of 23 August 2013.

³⁰ Lamps categorised as hazardous e-waste were banned from landfill as of 23 August 2016.

³¹ Waste slag from metallurgical process; ash from combustion and gasification; gypsum from pulp, paper and cardboard production, and processing; and biomass of plant, animal, or micro-organism's origin.

4 Opportunities, drivers and barriers

There are opportunities for value-add stakeholders in organics, e-waste, plastics, and builders' rubble, some of which are cross-cutting.

South Africa's recycling sector is bound to economic principles, and therefore waste processing must make business sense. In other words, the value of material must outweigh the cost of collecting and processing. The viability of waste beneficiation solutions hinges on, amongst others:

- the characteristics of the waste generated (type, volume, level of homogeneity, degree of contamination, and effort required to extract non-recyclables);
- the localities of points of generation and utilisation of beneficiation products and by-products;
- who has ownership of the waste (municipal or private);
- the regulatory local and national framework; and
- the cost of labour.

This may change for the paper and packaging, e-waste, and lighting industries with the implementation of EPR (see Section 3.3). Table 6 summarises a number of waste value-add opportunities that exist within the Western Cape, whilst the opportunities are discussed in more detail further on.

- **Organics:** The Western Cape generated ~533 745 tonnes of MSW organics and ~326 935 tonnes of commercial and industrial organics in 2019. Combined, the market value of MSW and commercial and industrial organics is estimated between R86 and R162 million³². At a municipal level, the greatest value lies in the CCT metropolitan area with an estimated market value of between R61 and R115 million.

Further to this, the cost of landfilling commercial and industrial organics results in an estimated ~R138 million³³ in disposal overheads for 2019.

- **Plastics:** The Western Cape generated between 138 278 and 162 138 tonnes of plastics in 2019. The market value is estimated at R473.8 and R631.7 million per year³⁴. At a municipal level, the greatest value lies in the CCT metropolitan area with an estimated market value of between R333.5 and R444.7 million.
- **E-waste:** The Western Cape generated ~42 592 to ~67 906 tonnes of e-waste in 2019. The market value is estimated at R53.5 to R106.7 million per year. At municipal level, the greatest value lies in the CCT metropolitan area with a conservative estimated market value of between R35 and R75.1 million.
- **Builders' rubble:** The Western Cape generates ~1.7 million tonnes of builders' rubble. The market value is estimated at ~R48 million per year. At a municipal level, the greatest value lies in the CCT metropolitan area with an estimated market value of R30.7 million.

³² A value of between R100 (based on R20 per 20 kg of compost sold in store which is generated from 200 kg of organic waste) and R188 (based on the Waste Road Map (DST, 2014) value for organics) per tonne of organics

³³ Based only of the CCT landfill gate fee of R584 (incl. tax) per tonne of general waste and excludes transport and treatment fees (if required).

³⁴ Based on the price a large collector pays for LDPE – R1 950 (low) and R2 600 (high) per tonne.



Table 6: Summary of waste value-add opportunities in the Western Cape

Stream	Opportunities	Drivers	Enablers
Organics	Value-add to between 185 000 and 293 000 tonnes a year of contaminated CCT metropolitan area MSW organics	<ul style="list-style-type: none"> Organic waste 2027 landfill restrictions Decreasing municipal landfill airspace 	<ul style="list-style-type: none"> Easing of composting regulations Carbon credit market Growing demand for CO2 Increasing cost of electricity
	Value-add to cleaner / pre-processed organics Stellenbosch local municipality	<ul style="list-style-type: none"> Increasing cost of landfilling Carbon tax liability (future) 	<ul style="list-style-type: none"> Electricity wheeling (potential future) Food Loss and Waste Voluntary Agreement
	Value-add to several hundred tonnes a day of low value digestate from potential municipal MBT	<ul style="list-style-type: none"> Market demand for clean dry recyclable feedstocks 	
	Further value-add to 109 – 136 tonnes a day of CCT’s dried Biosolids Beneficiation Facility digestate		
	Value-add to several hundred tonnes a day of low value digestate from private MSW biogas solutions (currently not operational)		
	De-packaging technologies for processing packaged organics		
Plastic	Replacing virgin material with recycle	<ul style="list-style-type: none"> Decreasing municipal landfill airspace 	<ul style="list-style-type: none"> South African Plastics Pact Municipal infrastructure investments
	Technology to increase recycle quality	<ul style="list-style-type: none"> Perceived job potential Global / local plastic sentiment 	<ul style="list-style-type: none"> Extended Producer Responsibility Increased foreign demand for recycle
E-waste	National pre-processing and processing capacity	<ul style="list-style-type: none"> Precious metal prices 	<ul style="list-style-type: none"> Extended Producer Responsibility
	A licensed pre-processing / processing facility for the Western Cape	<ul style="list-style-type: none"> National E-waste Landfill Ban (2021) National Battery Landfill Ban (2021) 	
	Processing of SADC feed-stocks	<ul style="list-style-type: none"> Perceived job potential 	
Builders’ Rubble	Value-add to 9 million tonnes of builders’ rubble for application as a secondary construction material – across all applications	<ul style="list-style-type: none"> Increasing costs of virgin material Decreasing municipal landfill airspace 	<ul style="list-style-type: none"> Performance evidence base from pilot sections, including recovered aggregate Auditable quality assurance systems for the handling and processing of rubble
	Value-add to 2.25 million tonnes of builders’ rubble for application as a road-build-ing material	<ul style="list-style-type: none"> Lower logistical costs of the supply of secondary material 	<ul style="list-style-type: none"> Municipal focus on landfill diversion
	Manufactured building sand from rubble	<ul style="list-style-type: none"> National Roads Policy (future) Material availability (sand) 	<ul style="list-style-type: none"> Municipal diversion focus Carbon Tax Act negative impact on business case for competing virgin material with road building materials cement and asphalt
	Municipal builders’ rubble crushing contracts for the CCT, and the Stellenbosch and Saldanha Bay municipalities		

Stream	Barrier / Risk	Term ³⁵	Macro-Environment
Organics	<ul style="list-style-type: none"> Inadequate source separation Composting registration regulations Confidence in bioenergy projects Competition for organics by pig farmers Short procurement durations Difficult procurement / tender process Sensitive / lack of market for by-products Lack of offtake for tailings Tailings landfill disposal costs Lack of electricity grid feed-in 	Medium – Long	<ul style="list-style-type: none"> Operation Phakisa focus on organic waste Greenhouse gas reduction commitments / ambitions CCT envisions generating own electricity Consumer awareness of food waste and its impact on the environment
		Short – Medium	
		Medium – Long	
		Short – Long	
		Medium – Long	
		Short	
Plastic	<ul style="list-style-type: none"> Inadequate source separation Contamination Delay in implementation of EPR Low end-market growth Fluctuating virgin resin prices 	Short – Medium	<ul style="list-style-type: none"> Operation Phakisa focus on plastics Consumer awareness International commitment
		Short – Medium	
E-waste	<ul style="list-style-type: none"> Lack of reliable data Access to feedstocks Licensing of recycling / recovery facilities Cherry-picking of high-value e-waste DEFF view of transboundary e-waste movement Delay in implementation of EPR 	Medium – Long	<ul style="list-style-type: none"> Operation Phakisa focus on e-waste International commitments Transboundary movement (Basil convention)
		Short – Medium	
		Medium – Long	
Builders’ Rubble	<ul style="list-style-type: none"> Poor perception by construction industry Poor practice of some in crushing industry Lack of quality standard for handling / processing Lack of specification for road building aggregate, inclusive of recovered aggregate 	Medium – Long	<ul style="list-style-type: none"> Operation Phakisa focus on C&D Waste Greenhouse gas commitments / ambitions
		Medium – Long	
		Short – Medium	
		Short	

4.1. Organics

Organic waste³⁶ is a broad stream that exists in various forms and volumes, ranging from small inconsistent household volumes that are mixed and highly contaminated, to large industrial and/or agricultural volumes of consistent, homogeneous and uncontaminated streams.

Separating organics from the waste system has the potential to unlock the quality and quantity of valuable dry recyclables that otherwise would have been contaminated. Although it is the stream that has the greatest impact on the overall waste system, it is the stream with the lowest value proposition in South Africa. As such it has been diverted more as a means to reduce business overheads, rather than being purchased as a feedstock for value-add solutions.

The demand for organic waste is increasing, in particular for clean and homogenous streams,

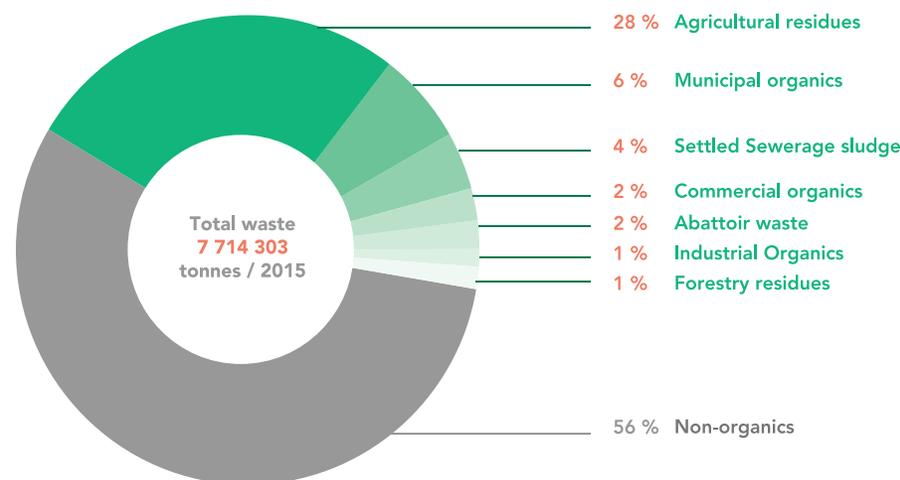


Figure 11: Organic waste relative to total waste generated in the Western Cape in 2015

Source: DEDAT (2016)

and the market is showing potential. This is largely driven by rising landfill costs, private sector diversion pacts and targets, and the 2027 landfill restriction anticipated for the Western Cape. Further liabilities to both municipalities and the private sector may also include the implementation of the Carbon Tax Act's future tax on greenhouse gas emission from landfills if / when included in the second phase expected in 2023 (see Section 3.2).

4.1.1. Market overview

Organics waste generated:

Figure 11 shows the distribution of the organic waste in the Western Cape. Although most of the organics produced in the Western Cape is largely generated by the agricultural sector, the province is not a homogenous entity. Table 7 provides a detailed breakdown of organic waste streams per district municipality.

Table 7: Organic waste generated in the Western Cape in 2015³⁷

Munic / Metro	MSW Organics	Industrial	Commercial	Agricultural / Abattoir	Forestry Residues	Wet Sewerage	Total
City of Cape Town	342 505	76 490	140 232	57 783	9 102	190 995	817 107
Cape Winelands	58 715	11 877	21 775	300 183	4 551	39 846	436 947
Eden	39 143	8 441	15 476	437 298	63 715	28 436	592 509
West Coast	24 465	4 742	8 693	913 183	4 551	19 525	975 159
Overberg	19 572	3 665	6 719	531 785	9 102	12 691	583 534
Central Karoo	4 893	517	948	34 531	0	3 530	44 419
Total	489 293	105 732	193 842	2 274 763	91 021	295 023	3 449 674

Source: DEDAT (2016)

The rest of this section will focus on MSW organic waste, and commercial and industrial organic waste (i.e. it excludes agricultural opportunities). Much of the inherent value of MSW organics (and subsequent value of other materials) is lost due to co-disposal and landfill. Furthermore, agricultural and forestry residues are complex and not fully understood. In many cases such waste streams are already used in animal feed and/or ploughed back into the soil. For some agricultural and forestry opportunities, please see the 2018 Waste Economy MIR.

MSW organics generated:

The Western Cape generated ~489 293 tonnes of MSW organics in 2015. This equates to 20% of the total ~2 387 353 tonnes of MSW generated. It is expected to increase to ~533 745 tonnes by 2019 and ~567 463 tonnes by 2023, based on population growth. As the provincial metropolitan, the CCT metropolitan area will continue to generate the bulk (73%) of MSW organics. Table 8 shows the projected distribution of MSW organics across district municipalities for 2019 and 2023.

Table 8: MSW organic waste generated in the Western Cape in 2015, 2019, and 2023

Municipality / Metro	2015 (t/yr)	2019 (projected)			2023 (projected)
		Generated (t/yr)	Concentration (t/km ² /yr)	Per Capita (kg/p/day)	
City of Cape Town	342 505	375 722	153,61	0,233	401 032
Cape Winelands	58 715	63 907	2,98	0,193	67 907
Central Karoo	4 893	5 026	0,13	0,190	5 090
Eden District	39 143	40 971	1,76	0,183	42 198
Overberg	19 572	21 330	1,74	0,197	22 731
West Coast	24 465	26 791	0,86	0,163	28 504
Total	489 293	533 745			567 463

Source: Inferred and projected from DEDAT (2016) using population growth (Quantec, 2019)

³⁶ National Waste Information Regulations define organic waste as garden waste, food waste and wood waste

³⁷ The general split between industrial and commercial waste is 60/40. Of this, the organic fraction for industrial waste is 20%, and for commercial waste it is 55% (Jeffares and Green, 2014).

Commercial and industrial organics generated:

The Western Cape generated ~299 575 tonnes of commercial and industrial organics in 2015. It is expected to have increased to ~326 935 tonnes in 2019, and to increase to ~347 697 tonnes by 2023. The CCT metropolitan area continues to generate the bulk (73%) of this. Table 9 shows the projected distribution of commercial and industrial organics across district municipalities for 2019 and 2023.

Table 9: Commercial and industrial organic waste generated in the Western Cape

Municipality / Metro	2015 (actual)		2019 (projected)			2023 (projected)	
	Ind. (t/yr)	Comm. (t/yr)	Ind. (t/yr)	Comm. (t/yr)	Concentration (t/km ² /yr)	Ind. (t/yr)	Comm. (t/yr)
City of Cape Town	76 490	140 232	83 908	153 832	97,20	89 561	164 195
Cape Winelands	11 877	21 775	12 927	23 700	1,71	13 736	25 184
Central Karoo	517	948	531	974	0,04	538	986
Eden District	8 441	15 476	8 835	16 199	1,07	9 100	16 684
Overberg	3 665	6 719	3 994	7 322	0,92	4 257	7 804
West Coast	4 742	8 693	5 193	9 519	0,47	5 525	10 128
Western Cape	105 732	193 843	115 388	211 546		122 716	224 981
	299 575		326 935			347 697	

Source: Inferred and projected from (DEDAT, 2016) using population growth (Quantec, 2019)

Organics waste recycled:

There are only three private sector facilities licensed to process more than ten tonnes a day of mixed organics, including household organics. They are Okran (a subsidiary of Reliance composting), Agriprotein, and the Athlone integrated waste management facility (not operational at the time of writing this MIR).

These facilities have the capacity to process a combined ~204 765 tonnes per year. This equates to 91% of the total process capacity to meet the CCT metropolitan area demand. The remaining 9% processing capacity is made up of roughly fourteen smaller organic waste solutions that are processing less than 10 tonnes a day of mixed organics.

It should also be noted that the CCT will be investing in organic waste beneficiation. According to the 2019/20 medium-term budget, the Solid Waste Department plans to develop a Mechanical Biological Treatment (MBT) facility.

Unfortunately, at the time of writing this MIR, the details of the facility could not be confirmed. The CCT's Water and Sanitation Department has also secured a budget to develop three centralised Biosolid Beneficiation Facilities (BBF). Over the next ten years, these facilities will be processing a combined capacity of 245 tonnes a day of dried sludge from wastewater treatment works across the city. The CCT is considering opening two of these BBFs for the processing of both municipal and private sector sludges, and food/organic waste. The processing capacity for external organics is still to be determined.

Figure 12 shows the capacity of existing and future solutions that are able to support the commercial, industrial and MSW organic waste (processing capacity for agricultural streams excluded) generated in Cape Town. This does not include the CCT's future projects, as these have not been finalised or made public as yet.

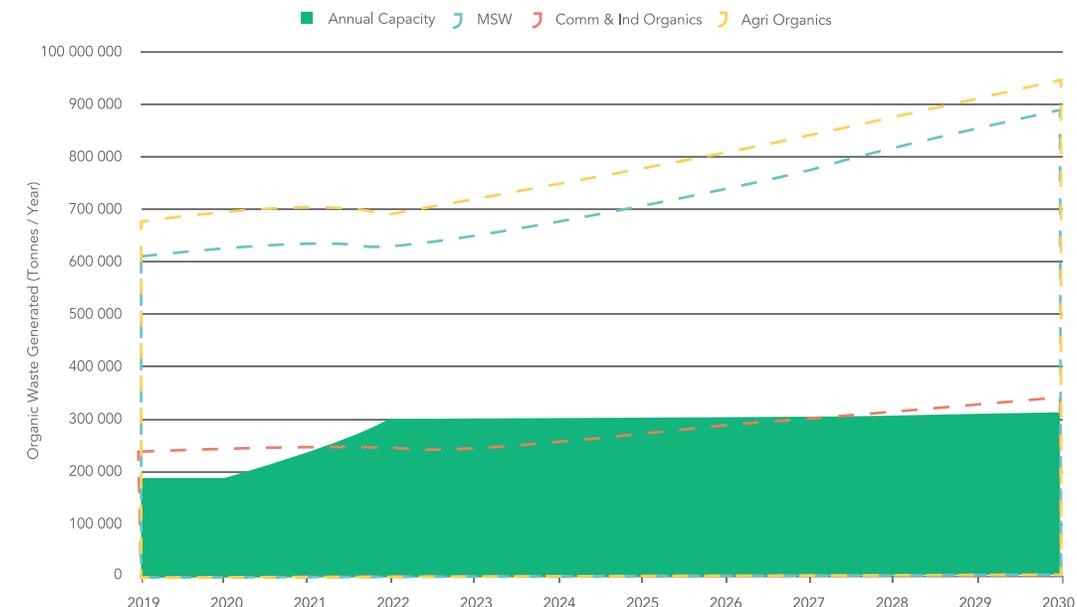


Figure 12: Current and planned organic waste solutions in CCT metropolitan area

Source: GreenCape engagements

4.1.2. Opportunities

The Western Cape generated a projected ~533 745 tonnes of MSW organics in 2019 and ~326 935 tonnes of commercial and industrial organics in the same year. Assuming organics were made available, the MSW and commercial and industrial organics have a market value of between R86 and R162 million³⁸.

At a municipal level, the greatest value lies in the CCT metropolitan area (70% of the total waste stream) with an estimated market value of between R61 and R115 million. Furthermore, the landfilling of the organic waste costs the commercial and industrial sector ~R138 million³⁹ in disposal overheads for 2019.

Contaminated municipal solid waste organics

The CCT metropolitan area is projected to generate ~375 700 tonnes of municipal solid waste (MSW) organics in 2019 and ~401 000 tonnes by 2023. Currently there is no operational solutions to mixed and heavily contaminated

MSW organics. There will be between 185 000 and 293 000 tonnes a year of MSW organics available for companies that can provide solutions to heavily contaminated municipal feedstocks.

Though the Athlone private integrated waste management facility (IWMF) was not operational at the time of writing the MIR, it is anticipated that it would be by 2021. The private facility was designed to process ~108 000 tonnes per year of MSW organics through a refuse collection service level agreement with the CCT. It is unknown whether the re-launched facility will be processing MSW organics or cleaner private sector organics when operational. Further to this, the CCT itself is considering investing in a dirty MRF with an expected expansion towards a Mechanical Biological Treatment (MBT) facility. The establishment of the MBT facility has not been finalised as yet. Assuming the facility will have the same process capacity as the Athlone private IWMF, then when both facilities are established, there will be further need for robust solutions for the additional ~185 000 tonnes of MSW Organics.

³⁸ A value of between R100 (based on R20 per 20 kg of compost sold in store which is generated from 200 kg of organic waste) and R188 (based on the Waste Road Map (DST, 2014) value for organics) per tonne of organics

³⁹ Based only on the CCT landfill gate fee of R584 (incl. tax) per tonne of general waste, and excludes transport and treatment fees (if required).

This opportunity does not include the MSW organics from surrounding municipalities, most notably Stellenbosch and Drakenstein, which fall within the Cape Winelands district municipality. The whole district is estimated to generate ~67 900 tonnes of MSW organics by 2023. Both the Drakenstein and Stellenbosch local municipalities are investigating organic waste solutions. Drakenstein is investigating biogas, whilst Stellenbosch is developing a pre-processing facility to aggregate and clean MSW organics for the private sector.

Value add to cleaner / pre-processed organics: Stellenbosch local municipal

The Stellenbosch local municipality will be needing a solution to clean pre-processed post-consumer organics. The municipality is currently establishing an aggregation and pre-processing facility for both public and private organics. The details could not be made public at the time of writing this report. The purpose of the facility is to pre-process and clean organics to make available to the private sector. The municipality is unlikely to dictate the solution, as long as it diverts organics from landfill.

Further value-add to CCT's dried BBF digestate

During the next five years, the CCT will be needing solutions to 87 – 108 tonnes of dried digestate cake and an additional 22-28 tonnes in the next ten years. The CCT will be investing an expected R2.7 billion in the development of three centralised BBFs. Over the next ten years, these facilities will be processing a combined capacity of 245 tonnes a day of dried sludge from its wastewater treatment works. The CCT is considering opening up Cape Farms BBF to both municipal and private sector sludges and food/ organic waste. The opportunity lies in the further beneficiation of the dried digestate cake. The intention of the CCT is to make the high nutrient rich digestate cake available to the private sector to further benefit. The CCT will most likely need short term solutions for mechanically dewatered primary sludge that is going to landfill, even before the first BBF comes online

Value-add to low-value digestate from MSW biogas solutions

There are a number of planned public (CCT's potential MBT) and private biogas facilities (Athlone IWMF) that will more than likely be

generating several hundred tonnes a day of potentially heavily contaminated digestate in the medium to long term. If there is no further value added to the processed organics, then the liability falls on the organic waste processor to either landfill in the short or medium term, as a result of the implementation of the organic waste to landfill restrictions.

De-packaging technologies for processing packaged organics

The process capacity of the current and future facilities is expected to reach ~920 tonnes per day of the CCT metropolitan area's organics, or 289 000 tonnes per year. It is therefore unlikely that there will be adequate capacity to process commercial and industrial organics. However, there is also ~375 700 tonnes of MSW organics that need processing. Reducing liability of by-products disposal (see [Section 2.4.1](#)) depends on the actual material in question and the level of contamination. Commercial streams are generally more contaminated by packaging than industrial organics. MSW organics are traditionally heavily contaminated with packaged organics, or packaging in general. There is thus a demand for technologies that are able to clean and reduce contamination of both input organics and the output products to ensure that packaging does not compromise the value of end products.

4.1.3. Drivers / Enablers

In addition to the drivers and enablers mentioned in [Section 2.4](#), the main market drivers and enablers for the organic waste are the following:

Organic waste 2027 landfill restrictions in the Western Cape

The greatest market driver will be the landfill restrictions for organics in the Western Cape (see [Section 2](#)). The Western Cape's DEA&DP implemented an organic waste diversion plan that seeks to divert 50% of organic waste from landfill by 2022, and 100% by 2027. This should increase the demand for organic waste solutions for the private sector and municipalities. This will likely only unlock feedstocks in the next two to seven years, but the lead-up time provides solution providers room to investigate opportunities, secure feedstocks, and navigate the regulations.

Carbon Tax Act

Section 13 of South Africa's Carbon Tax Act (see [Section 3.2](#) of this report) provides offset allowances for heavy greenhouse gas (GHG) emitters. These emitters are afforded the opportunity to reduce their carbon tax liability by purchasing carbon credits from approved carbon credit projects. Organic waste solutions may seek to strengthen the business case by registering their activity as a carbon credit project, and benefit from carbon credits.

The climate change component must be built early into the business plan, as most carbon standards do not cover projects that include a climate change component as an afterthought. Furthermore, certain standards allow for the grouping of small projects into a single programme. As such, small organic solution activities may benefit from combining activities under a single programme.

Composing Norms and Standards

The proposed norms and standards for organic waste composting (discussed in [Section 3.2](#)) are expected to reduce the regulatory barriers for composting. Those composters processing more than 10 tonnes a day will no longer require a waste management licence. Obtaining such a licence requires going through a costly and onerous EIA process. These norms and standards have the potential to increase the processing capacity for smaller composters that are purposefully kept below licensing thresholds.

Food Loss and Waste Voluntary Agreement:

The Consumer Goods Council of South Africa (CGCSA) and the DTIC are in the process of establishing a South African Food Loss and Waste Voluntary Agreement (FLWVA). This FLWVA will require signatories to commit to the Sustainable Development Goal 12.3 target to reducing food loss and waste by 50% by 2030. Various large brand owners, most notably top food retailers, have shown active interest in this FLWVA. It is expected that such an agreement will filter through to supply chains. Such an agreement should see increased demand for landfill diversion solutions.

Operation Phakisa focus on organics

Of the 20 initiatives driven through the Chemical and Waste Operation Phakisa (see [Section 2.6](#)) to fast-track waste diversion, three initiatives focus specifically on organic waste:

- The zero sewage sludge to land / landfill by 2023 will focus on facilitating biogas operations at WWTWs.
- The zero meat production waste to landfill by 2023 will focus on driving the diversion of the meat production waste to value-add solutions.
- The 50% household organic separation at source by 2023 initiative seeks to enforce separation at source requirements on municipalities, in particular metros.

These three initiatives should actively result in or facilitate increasing national demand for organic waste solutions. Finalised plans had not been signed at the time of writing this MIR and as such, further details are still to be made public.

Feeding biobased electricity onto the grid

Current regulatory barriers prevent the sale of electricity to the grid, nor do they allow the wheeling of energy that enables third parties to utilise distribution grids to sell to willing buyers, also known as wheeling. Three major changes are taking place on the local government level that will more than likely strengthen the business case for biobased electricity markets:

- The CCT, Tshwane, City of Johannesburg (via City Power), and Nelson Mandela Bay metros are challenging the current “single-buyer” model to allow metros to purchase electricity from independent power producers, including renewable energy producers.
- Increasing off-take agreement options for local embedded electricity generators:
 - Electricity wheeling will allow generators to “wheel” their electricity to a willing buyer anywhere within a municipality or country.
 - The release of regulations allowing private sector energy trading has also opened the market to private sector power purchase agreements, and on-sales to private consumers using the national and local distribution networks.
- Country-wide rollout of national small-scale embedded generation (SSEG) rules, regulations and tariffs to promote the safe and legal uptake of SSEG for own use⁴⁰.
 - Small-scale embedded generation already enjoys regulatory implementation in most of the Western Cape municipalities.
 - These changes at municipal level complement legislative updates, e.g. the gazetted Integrated Resource Plan 2019 on a national level. Together they herald a freer, more ‘liberalised’ electricity market, in which municipalities and end users will be more empowered in their energy choices.

For further information please see GreenCape’s [2020 Energy Services MIR](#)⁴¹.

Biogas Air Emissions License clarification

The DEFF has provided formal clarification to the biogas industry that biogas production does not fall under Category 10 (animal matter processing) of the NEM:AQA ([Act 39 of 2004](#)) Listed Activities⁴² ([GN893 of 2013](#)). Furthermore, DEFF also confirmed that although Subcategory 1.4 (gas combustion installations) of the listed activities is still applicable to biogas, it is unlikely to affect biogas installations as the capacity is normally below the listed activity threshold. This means that biogas installations of less than 50 MW thermal input, do not require an air emissions licence. This clarification has been largely driven by the Southern African Biogas Industry Association (SABIA) which has been instrumental in demonstrating that biogas projects reduce emissions through methane capture and combustion. This should reduce the cost, delays and risks associated with the EIA process for smaller biogas facilities.

4.1.4. Risks / Barriers

In addition to the risks and barriers mentioned in [Section 2.5](#), specific risks and barriers include:

Inadequate source separation

Contamination of organics by non-organic dry waste streams is a major barrier, most notably MSW organics, that limits the available value-add solutions. This also limits the end marketability of by-products of solutions. Until separation at source is actively implemented and enforced in South Africa and the Western Cape, it is unlikely that sensitive organic solutions will thrive, or that the business case for solutions that rely on end products will be strong.

Furthermore, South Africa in general lacks effective household hazardous waste⁴³ 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 solutions unfit for further value-add. This will ultimately require landfill in an appropriate landfill. In effect, this essentially renders organic waste solutions, pre-treatment, and volume reduction mechanisms rather than value-add solutions.

Need for compost certification of post-treated organics

Organic waste traditionally requires a great deal of pre-processing if not separated at source. This is more complex when dealing with MSW organics as contamination is very high, with inconsistencies and variability in volumes and the character of feedstocks. Furthermore, in order to secure viable markets as compost or digestate to be used as fertilizer, the end products need to be certified. This certification is heavily regulated⁴⁴. The benefits of certification are that the certified by-products can be sold at a higher price than non-certified by-products.

Competition for organics by pig farmers

Organic waste solution providers are competing with livestock farmers, mainly pig farmers, for access to organic waste feedstocks such as food waste. Feeding organic waste to livestock is not recognised as an organic waste treatment. As such it 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. Waste generators are often unaware of the regulations governing farm feed, and give or sell waste to farmers. There could also be waste generators who flout the regulations wilfully, for example some farmers themselves, or a third party logistics entity.

Confidence in bioenergy projects

GreenCape’s engagements indicate that some financial institutions and investors are losing confidence in bioenergy projects. Various factors have affected the viability of biogas projects in South Africa, including:

- types and security of feedstock;
- availability of realistic revenue streams;
- the cost of managing digestate;
- the project/stakeholder structure;
- the choice of technology;
- the conditions of contract agreements; and
- a lack of skills to operate facilities.

Feeding bio-based electricity onto the grid

The South African electricity market is currently managed on a single-buyer model by the state owned entity, Eskom. Eskom is responsible for the generation and transmission of electricity, and also controls a minority share of the distribution market. Current regulatory barriers prevent the sale of electricity to the grid, nor do they allow the wheeling of energy that enables third parties to utilise distribution grids to sell to willing buyers, also known as wheeling. However, there are movements to a more liberalised energy system. See [Section 4.1.3](#) or GreenCape’s [2020 Energy Services MIR](#)⁴⁵ for more details.

Lack of a biobased heating grid

The business case of waste-to-energy projects is often pegged to either the sale of electricity, or heating too. This business case is often more attractive in colder climates with district heating infrastructure. However, there is no central heating market in South African, other than in very specialised cases.

4.1.5. Recent developments

Athlone private sector integrated waste management facility

Africa’s first attempt at extracting value from mixed MSW at scale was met with a plethora of challenges, resulting in the closure of the facility. Athlone’s private integrated waste management facility (IWMF) cost R400 m to construct and had a design capacity to process 600 tonnes per day of mixed MSW. The facility has since closed down, with one of the initial investors, the Industrial Development Corporation of SA (IDC), taking over management of the facility and assets. At the time of writing this MIR, the IDC had sent out a request for proposals to various stakeholders that had responded with a previous expression of interest. The IDC is in the process of undertaking due diligence to determine which of the five entities provided the most viable business case for investment and sustainable operation of the facility. As a result, there are no direct opportunities for investors to submit proposals.

⁴⁰ The generation of electricity on the load site where it will also be consumed.

⁴¹ www.green-cape.co.za/market-intelligence/

⁴² List of activities which result in atmospheric emissions that have or may have a significant detrimental effect on the environment, including health, social, economic, and ecological conditions, or cultural heritage.

⁴³ For example, household chemicals, batteries, fluorescent lighting.

⁴⁴ Through the Fertilizers, Farm Feeds, Agricultural Remedies and Stock Remedies Act 36 of 1947, as amended.

⁴⁵ www.green-cape.co.za/market-intelligence/

However, there are potential opportunities to assist the winning bid with solutions to the designed 100 tonnes a day of dewatered (30% moisture) digestate, and ~200 tonnes a day of tailings. These two by-products were liabilities for the previous facility.

Municipalities invest in organic waste value-add

The CCT has budgeted ~R848 million over the next five years to establish a Mechanical Biological Treatment (MBT) facility. The details of the MBT facility have yet to be confirmed or made public, but if implemented it is likely to be processing several hundred tonnes a day of municipal solid waste (MSW). Generally speaking, MBT usually results in recyclables being extracted, and biogas being employed. The by-products from the process may be made available to private sector solutions for value-add.

The Stellenbosch local municipality is developing an organic waste transfer and pre-processing facility. The details of the facility have yet to be made public, but the intention is to process public and private sector organics into cleaner organics. The upgraded / cleaned organics will subsequently be made available to a solution with the lowest cost to the municipality.

Digital Global Biogas Cooperation

The Digital Global Biogas Cooperation is a cooperation project between biogas technology exporting and importing countries. The overall objective is to support the European biogas/ biomethane industry by preparing markets for the export of sustainable biogas/biomethane technologies from Europe to developing and emerging countries such as Argentina, Ethiopia, Ghana, Indonesia and South Africa.

This will be achieved by:

- the development and application of innovative digital and non-digital support tools and actions;
- knowledge transfer and capacity building; and
- the preparation of demo cases up to the investment stage.

⁴⁶ Grant agreement N°857804

⁴⁷ Input recycling rate refers to material entering a recycling facility. It does not include the wastage or by-product of the recycling process.

⁴⁸ The geographical distribution range of plastic for each province is estimated based on the population distribution of provinces, and the domestic product per region (GDPR) distribution of provinces as they relate to each other.

The project aims to increase the share of renewable energies, both in Europe and in importing countries. The project has received funding from the European Union's Horizon 2020 research and innovation programme⁴⁶.

4.2. Plastics

South Africa has a well-established plastic collection and recycling industry. Its input recycling rate⁴⁷ of 42% is one of the best performing input recycling rates in the world (PlasticsSA, 2019). Furthermore, which is crucially relevant, most of South Africa's plastic recycling activities take place within South African borders, with only 2% of plastic recycling conducted outside the country.

The success is largely due to the South African industry associations facilitating the material supply for recycling and market demand for recycle. Although plastic recycling is still largely operating within economic boundaries, it has a stronger business case in South Africa. This viability can be attributed to South Africa's cheap labour and a highly active waste picker sector.

However, expected regulatory and policy changes, coupled with industry-driven pacts and agreements, and large municipal infrastructure investments, should see further support for plastic recycling in South Africa, and specifically the Western Cape.

4.2.1. Market overview

Plastic waste generated

Determining the amount of plastic waste generated by South Africa is extremely difficult. However, what is known is the amount of overall virgin material used in the country, coupled with the recycle produced by recyclers per province (PlasticsSA 2018). Combining the two figures provides an indication of the material available for manufacturing of products. Figure 13 illustrates the extrapolated distribution of plastic waste generated and plastic recycling across South Africa⁴⁸.

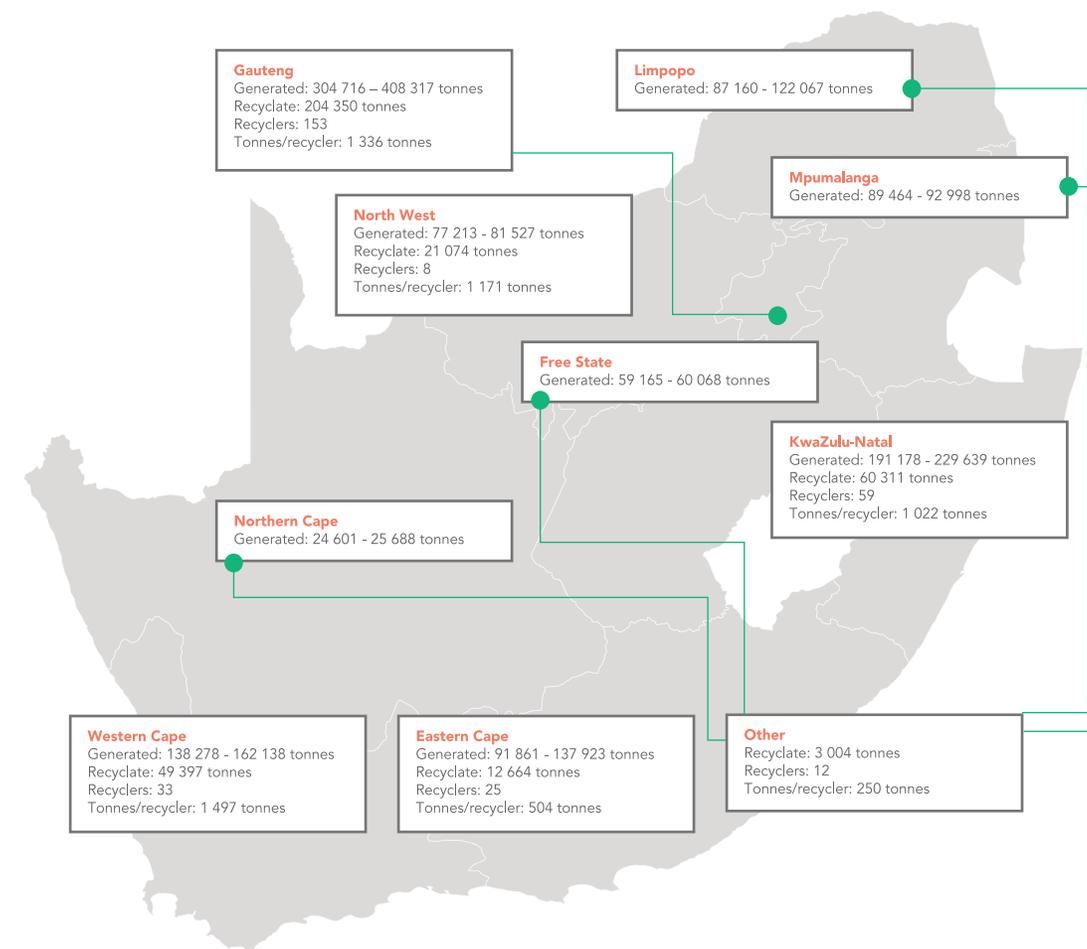


Figure 13: Provincial distribution of plastic waste generated and recycled based on population in 2018

Source: Adapted from PlasticsSA (2018)

Where Figure 13 illustrates plastic waste generated based on population and GDPR distribution, DEDAT's (2016) local Western Cape waste study estimated that the province generated ~222 741 tonnes of MSW plastic waste alone in 2015 (~9% of total MSW). This is projected to grow to 242 977 tonnes in 2019⁴⁹ and to 258 326 tonnes by 2023.

⁴⁹ Figures for 2019 to 2022 extrapolated using a population growth of 2.1% per year. MSW plastics do not include commercial, industrial and agricultural waste streams.

Table 10: MSW plastic generated in the Western Cape in 2015, 2019, and 2023

Municipality / Metro	2015 (t/yr)	2019 (projected)				2023 (projected)
		Generated (t/yr)	Concentration (t/km ²)	Per Capita (kg/p/day)	Value (R's million) ⁵⁰	
City of Cape Town	155 919	171 040	69,93	0,106	R333.5 – R444.7	182 562
Cape Winelands	26 729	29 093	1,35	0,088	R56.7 – R75.6	30 913
Central Karoo	2 227	2 287	0,06	0,087	R4.5 – R5.9	2 317
Eden District	17 819	18 651	0,80	0,083	R36.7 – R48.5	19 210
Overberg	8 910	9 710	0,79	0,090	R18.9 – R25.2	10 348
West Coast	11 137	12 196	0,39	0,074	R23.8 – R31.7	12 976
Western Cape	222 741	242 977			R473.8 – R631.7	258 326

Source: Inferred and projected from DEDAT (2016) using population growth (Quantec, 2019)

The CCT metropolitan area is the largest generator of MSW plastics in the Western Cape. The CCT's more recent 2018 waste characterisation study (See Annex B) found that plastics made up 14.3% of its MSW fraction, compared to the estimate of 9.3% of the DED&T (2016) study. More specifically, soft plastics made up 7.2%, and hard plastics accounted for the remaining 7.1%.

Plastic recyclate generated

South Africa converted a total of ~1.88 million tonnes of polymers into plastic products for the year 2018, with an additional 19 645 tonnes converted offshore (PlasticsSA, 2019). The polymer market is still dominated by virgin polymers with 81% of the market, whilst recyclate made up only 18% of the local market with the remaining 1% of plastic exported. Figure 14 illustrates this dependency on virgin materials over recycled polymers, whilst Figure 15 illustrates this dependency in more detail for each of the major polymers.

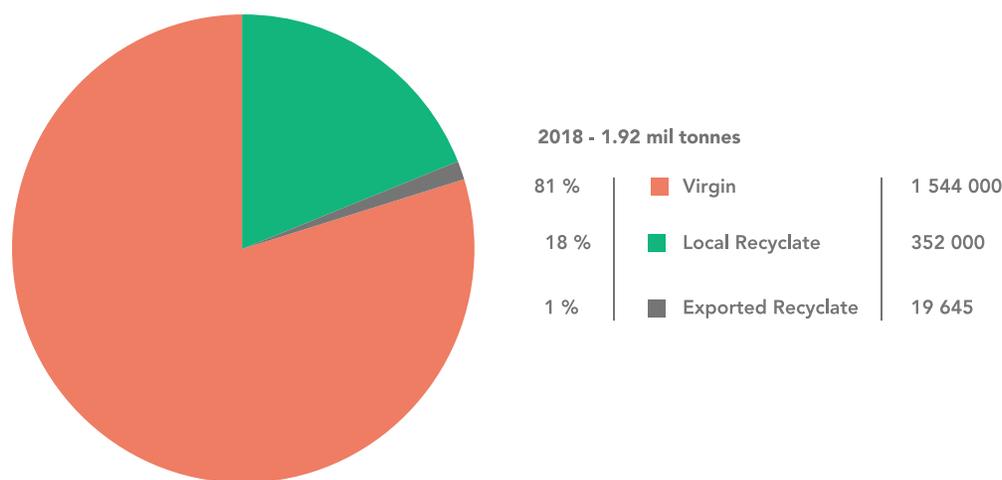


Figure 14: South Africa's plastic consumption and export for 2018

Source: PlasticsSA (2019)

⁵⁰ Value is based on the price range a large Cape Town collector pays for LDPE per tonne — R1 950 to R2 600

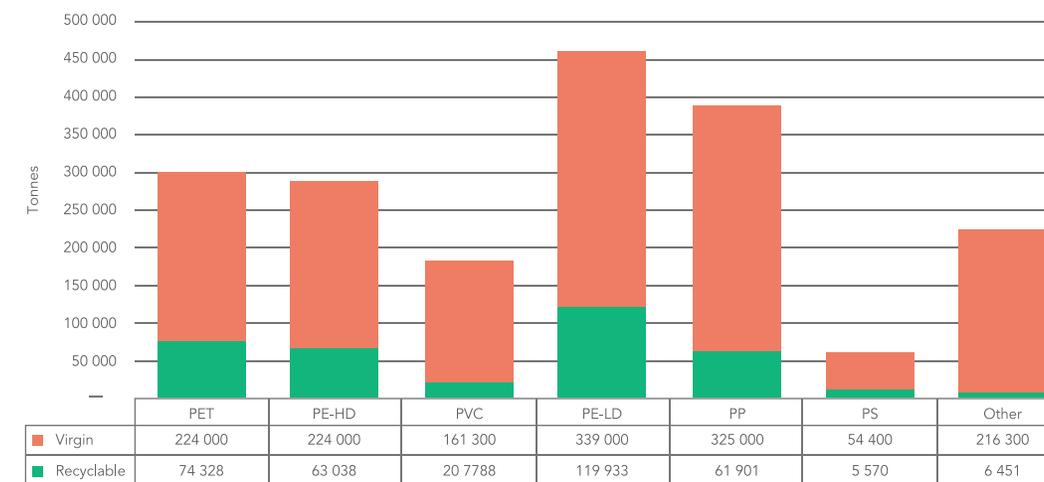


Figure 15: Comparison of the use of virgin plastic versus recyclate plastic in 2018

Source: PlasticsSA (2019)

Although the total polymer conversion increased by 4.9% between 2017 and 2018, virgin polymers conversion increased by 3.5%, whilst local recyclate conversion increased by 12.3% and exported recyclate increased by 13.6%. Figure 16 illustrates this recycling growth for South Africa's major polymer types, including recycled, and proportions recycled vs exported for recycling.

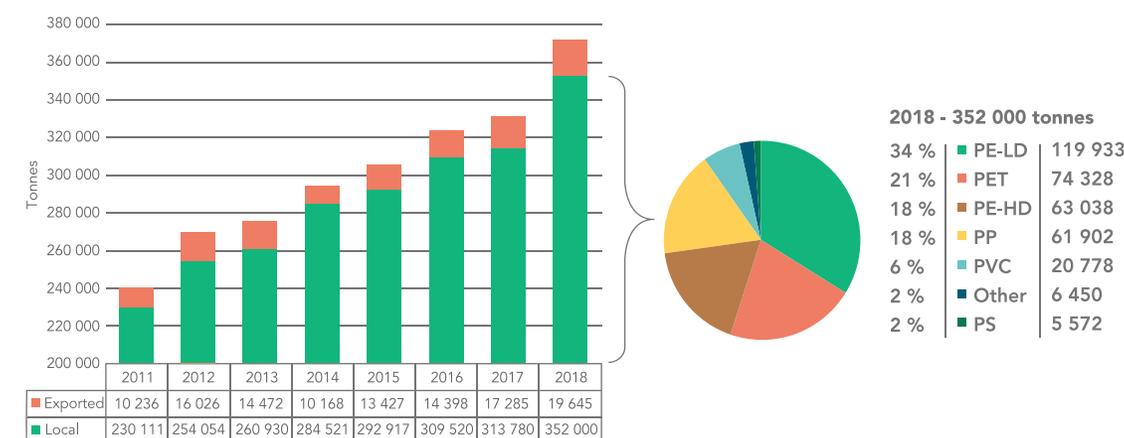


Figure 16: Types and tonnages of plastic recycled and exported in South Africa in 2018

Source: PlasticsSA (2019)

Source of material

South Africa's recyclers source 70% of feedstock from post-consumer sources. The remaining 30% of feedstocks were sourced from pre-consumer sources. This is due to a well-established collection and consolidation network made up of a largely very active informal collection network

of between 60 000 and 90 000 individuals⁵¹ (Godfrey, et al., 2016). In 2015, it was reported that these informal collectors supplied between 80% and 90% of plastic packaging for recycling (PlasticsSA, 2015). Figure 17 illustrates the sources of feedstocks by value chain in 2018.

⁵¹ This source originates from 2009 and is only an estimate; there are no official statistics on the South African informal waste sector.

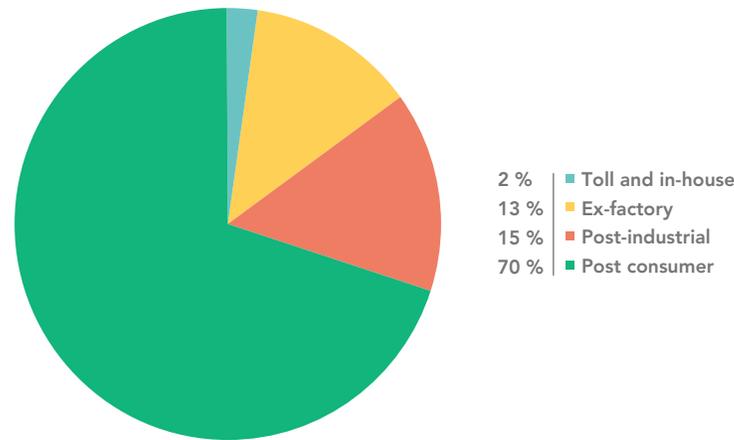


Figure 17: Source of plastic feedstocks by value chain in 2018

Source: PlasticsISA (2019)

Recyclers

South Africa's robust collection and aggregation network is driven by a strong and competitive processing and recycling sector. Gauteng continues to lead the plastic recycling sector in terms of the number of recyclers and tonnages of recyclate manufactured.

However, the Western Cape took over the top spot in terms of the average amount of recyclate manufactured per recycler. Figure 18 illustrates the number of recyclers per province, aggregated tonnage of recyclate manufactured per province, and average recyclate produced per recycler.

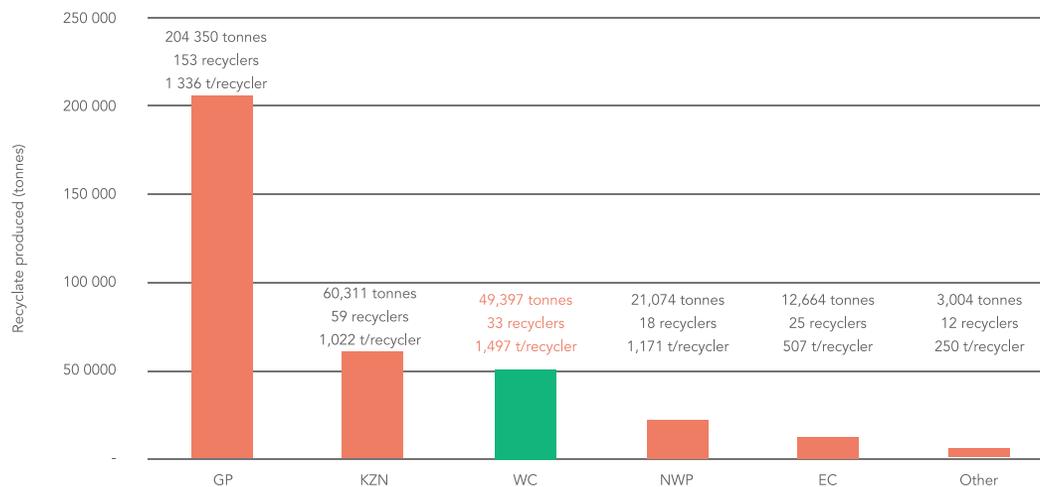


Figure 18: Number of plastic recyclers per province and total recyclate produced in 2018

Source: PlasticsISA (2019)

South Africa has experienced a substantial increase in the number of recyclers established over the course of a year. In 2017, the South African Plastics Recycling Organisation (SAPRO) reported a total of 212 recyclers operating in South Africa. This increased to 300 in 2018, representing a 42% increase. Much of this increase has been in Gauteng where an additional 52 recyclers joined the 101 recyclers. The Western Cape added eight new plastic recyclers over the same period.

Although there has been a surge in the number of recyclers, the sector is still highly concentrated. According to PlasticsISA (2019), 60 recyclers manufactured 70% of the recyclate, and the top 30 recyclers manufactured 54% of the recyclate. Gauteng hosted 17 of the top 30, whilst the Western Cape and KwaZulu-Natal host only six and five respectively.

End Markets

South Africa's strong processing and recycling sector is driven by market demand for plastic recyclate. Figure 19 provides the end market breakdown for recyclate in South Africa. As shown, packaging (flexible and rigid) continues to dominate with 28% of the market. The agriculture and building / construction sectors absorb a combined 34% of the market, whilst clothing / footwear absorbs 14% of recyclate.

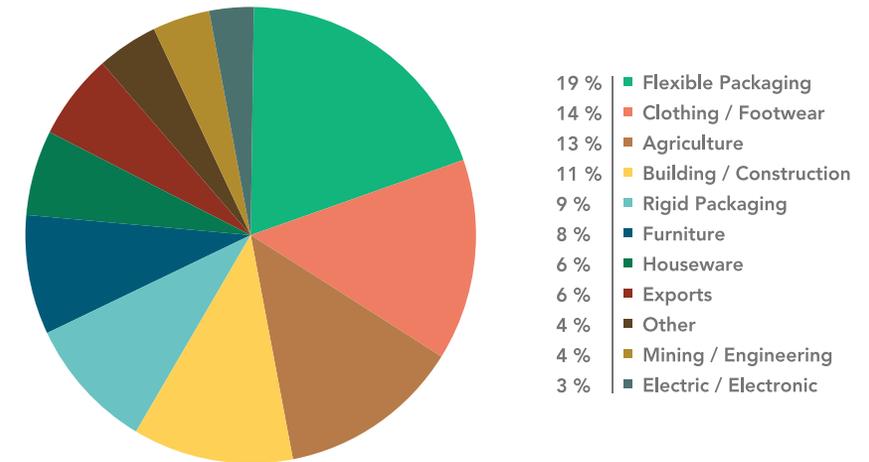


Figure 19: End market of plastic recyclate in 2018

Source: PlasticsISA (2019)



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4.2.2. Opportunities

Plastic waste generated

Determining the amount of plastic waste generated by South Africa is extremely difficult. However, what is known is the amount of overall virgin material used in the country, coupled with the recyclate produced by recyclers per province (PlasticsSA 2018). Combining the two figures provides an indication of the material available for manufacturing of products. [Figure 13](#) illustrates the extrapolated distribution of plastic waste generated and plastic recycling across South Africa.

Opportunities in the plastics sector are not so much in the collection and processing space, but rather in increasing the quality of recyclate for the growing end-market that demands quality.

Virgin replacement

As indicated earlier, South Africa's ~1.88 million tonne a year polymer market is dominated by 81% of virgin material with 18% consisting of recyclate. This indicates a high dependency on virgin polymers. The final focus of the major plastic recyclers is to manufacture virgin replacement. As such there is an opportunity for technology providers to assist the major plastic recyclers with quality increase and assurance solutions to increase the marketability of their recyclate. It is expected that the end-market demand will be further driven by the launch of South Africa's local Plastics Pact and the potential implementation of Paper and Packaging EPR (see [Section 3.3](#)), which incentivises the use of recyclate, and disincentives the use of virgin materials.

Further to the above opportunity, there is a demand to provide recyclers with technologies and solutions that increase the quality of recyclate, and secondly the consistency of quality recyclate that competes with virgin grade plastics. Recyclers source as much as 70% of feedstocks from post-consumer sources



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(including landfills). As South Africa has a low rate of separation at source, the quality of inputs for recycling is poor and highly contaminated, resulting in as much as 40% process-related wastage. Such contamination has the potential to affect the end quality of recyclate and subsequent end market — a market that is anticipated to grow in response to the launch of South Africa's local Plastics Pact and the promulgation of the Paper and Packaging IndWMP.

4.2.3. Drivers / Enablers

In addition to the drivers and enablers mentioned in [Section 2.4](#), the main market drivers and enablers for the plastic waste are the following:

Extended Producer Responsibility

Growth in the sector should be driven through the implementation of Extended Producer Responsibility (EPR). Although the Minister of Environment, Forestry and Fisheries has withdrawn the call for the paper and packaging industry to develop IndWMPs, she is likely to implement EPR measures (see [Section 3.3](#)). EPR should support education and awareness, increase collection (supply) of recyclable plastics, increase the market (demand) for recyclate, and ensure better quality feedstocks and subsequently lower processing overheads for recyclers.

South African Plastic Pact

In the meantime, WWF and SAPRO have taken a proactive approach in developing a South African plastics pact. The South African Plastic Pact should result in major brand owners implementing various initiatives to meet the five targets illustrated in [Table 11](#). These five targets should drive both the supply of recyclable material and the demand for high quality plastic recyclate.

Table 11: The South African Plastic Pact's five targets for signatories

Target 1	Target 2	Target 3	Target 4	Target 5
List of problematic / unnecessary plastic packaging / items and agree to measures to address by 2021	100% of plastic packaging to be reusable, recyclable or compostable by 2025	70% of plastic packaging effectively recycled by 2025	30% average recycled content across all plastic packaging by 2025	Still to be confirmed

Operation Phakisa supporting supply and processing

[Section 2.6](#) illustrates the update to the Chemical and Waste Phakisa and its 20 associated work streams. Initiative 8 focuses on the development and subsequent implementation of separation at source for municipalities. Initiative 9 focuses on the establishment of 17 MRFs and six recycling facilities across South Africa. Both work streams should support the supply of plastics for recycling; as well as process capacity of recyclable plastic.

4.2.4. Risks / Barriers

In addition to the ones mentioned in [Section 2.5](#), specific risks and barriers include:

Delay in EPR rollouts

As noted in [Section 2.6](#), the implementation of the IndWMPs has been met with delays even before the Section 28 notice was gazetted in December 2017. Now that the Section 28 notice has been withdrawn and a Section 18 EPR has been contemplated, there is no definite time frame for EPR implementation in South Africa. As such, investors and businesses looking to capitalise on the opportunities associated with plastic recycling should be aware of potential further delays.

Low growth in end-market

In the past, the recycling sector sustained itself through growth in end-markets for recyclate. South Africa has experienced low economic growth over the past few years, but it is expected to increase in the short term. However, the agricultural and construction sector, both of which are major end-markets for recyclate, have been the hardest hit by economic stagnation and have experienced negative growth.

Chinese ban increases local competition

China's Green Sword Programme resulted in the banning of certain waste imports into China.

Although this may have direct negative impacts on the paper and cardboard market for South Africa, the plastic industry has been less hard hit. This is because 94% of plastic recycling is done locally. However, PlasticsSA (2019) reported that South Africa has experienced an influx of Asian recyclers establishing operations over the course of the year, and subsequently exporting recyclate from South Africa to Asian markets. Gauteng has been the hardest hit with an increased number of recyclers — from 101 recyclers in 2017 to 153 in 2018. The Western Cape experienced an increase from 25 to 33 recyclers over the same period.

High levels of contamination

As indicated earlier, it is estimated that 70% of plastic that is recycled is sourced from post-consumer sources, including landfill (PlasticsSA, 2019). Furthermore, South Africa has a low level of separation at source. As a result, recycling feedstocks are of poor quality due to heavy contamination. Such contamination results in process-related wastage rates of 40% for post-consumer plastics. This increases the pre-processing and disposal overheads.

True plastic numbers

Although there is an understanding on the amount of virgin and recycled resin being converted into products, there is no sure understanding on the actual amount of plastic that is imported and exported, for example as packaging. The plastics sector's assumption is that the unknown imports are offset by the unknown export, and as such is not considered a blind spot by the industry. However, there is no certainty about the quality / recyclability of the plastics imported and the plastic exported. This should be resolved with the implementation of future EPR.

Alternative plastic contamination

A key requirement for ensuring an end-market for plastic recyclate is to secure confidence in the material as a viable alternative to virgin plastics. However, a growing concern for the plastics recycling sector is the rising interest in biodegradable / compostable and oxo-degradable materials as an alternative to plastic packaging. The plastic industry believes these alternative materials affect the long-term integrity of the recyclate for long-use plastics products.

4.2.5. Recent developments

Launch of South African Plastics Pact
The South African Plastics Pact was launched on 30 January 2020. The Pact has been developed by WWF SA in partnership with the Waste and Resources Action Programme (WRAP) and the South African Plastics Recycling Organisation (SAPRO), and is supported by the Department of Environment, Forestry and Fisheries, and the Ellen MacArthur Foundation's Plastics Pact network. The Pact requires signatory brand owners to meet the five home-grown targets. The targets should drive not just landfill diversion and environment leakages, but should also drive the supply and demand for plastic recyclate.

Alliance to end plastic in the environment

PlasticsSA launched the South African Alliance to End Plastic Pollution in the Environment. This is a campaign that includes a number of key stakeholders representing the local plastics value chain. The campaign members commit themselves to joining forces, and to collaborate to work towards the prevention and elimination of plastics in the environment. The first priority focus for the alliance will be tackling problematic "single use" packaging.

Fluctuating rPET Market Demand

One of South Africa's largest paper and plastics packaging manufacturers, Mpact, has made the decision to discontinue its R350 million investment into Polyethylene Terephthalate (PET) recycling operations in Wadeville, Gauteng, the reason being that the selling price of recyclate was below the cash cost to produce the material. To date, recycled PET (rPET) has been sold at a discount to encourage the uptake. However, with the significant decrease in the price of virgin PET, Mpact anticipates/expects that this will continue in the foreseeable future. The closure means

there will be a loss of 30 000 tonnes a year of recycling capacity.

However, another PET recycler, Extrupet, has recently concluded negotiations to expand its "bottle-to-bottle" plant in Wadeville. The investment will double the current capacity from 20 000 to 40 000 tonnes per annum of PET recyclate.

Further to this, Propet has invested R35 million into its Cape Town fibre plant to process an estimated 4 000 tonnes a year of specifically green rPET flake into high quality strapping. The market for this strapping has been further supported by South Africa's largest wood-based product manufacturer, PG Bison, and one of South Africa's largest corrugated box recyclers and manufacturers, Corru Seal. Both companies previously imported strapping from offshore markets. The investment supports 50 direct jobs.

4.3. E-waste

The term e-waste refers to electrical and electronic equipment⁵² that have reached end of life, or perceived end of life. In South Africa, e-waste is classified as hazardous waste as it contains materials (e.g. minerals, plastics, metals, and precious metals) that vary in toxicity and are integrated into equipment in ways that vary in levels of complexity.

The Western Cape province is an important e-waste aggregation node for the Eastern Cape and Northern Cape, and a key source of e-waste for Gauteng's pre-processors and processors. Although the Western Cape hosts formal and informal businesses that refurbish and/or dismantle consolidated e-waste, it lacks formal pre-processing and processing capacity. Dismantled materials and components, and aggregated materials from other provinces are transported to Gauteng for processing, or are exported.

South Africa has a well-developed network of formal and informal collectors and consolidators, with some e-waste reaching pre-processors and refurbishers. However, there is a lack of accurate national data concerning the specific type, rate, and the volume generated, circulated, processed and exported. This should change with the implementation of Industry Waste Management Plans (IndWMPs).

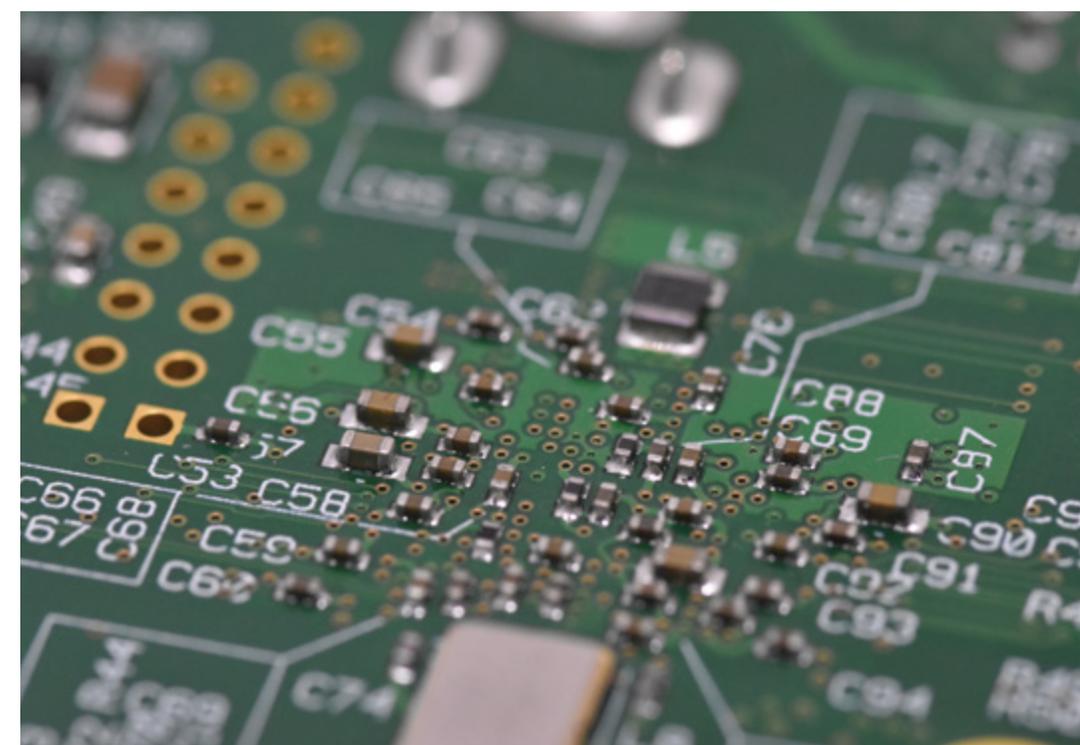
4.3.1. Market overview

E-waste generated

Determining the generation rates of e-waste in South Africa is challenging. Table 12 provides a summary of the various reported tonnages for South Africa and the Western Cape, with projected tonnages for 2019 based on population growth as estimated by Quantec (2019). For the purpose of this MIR, the tonnages as reported by the Western Cape-specific study by DED&T (2016), and ERA's (2018) estimated tonnages will be used.

Table 12: Reported tonnages of e-waste by various data sources

Data Source	Reference Year		Per capita (kg/yr)	2019 (projected) ⁵³		
	Year	Generated (t/yr)		Generated (t/yr)		
		South Africa		Western Cape	South Africa	Western Cape
ERA (2018)	2018	360 000	-	6,3	371 204	42 820
DEDAT (2016)	2015	-	62 251	10,0	588 125	67 843
EWASA (2016)	2015	322 000	-	5,8	337 307	38 910
Lydall et al. (2017)	2017	74 923	-	1,3	78 485	9 054
StEP (2013)	2012	339 310	-	6,6	385 751	44 498
UNU (2018)	2016	321 000	-	5,6	330 990	38 181



⁵² Includes small and large household appliances; office, information and communication technology; consumer electronics and entertainment equipment; lighting equipment; electrical/electronic tools; security and healthcare equipment; and mixed electrical/electronic equipment.

⁵³ Populations for South Africa (58 606 419) and Western Cape (6 760 561) were provided by (Quantec, 2019)

Growth of e-waste generation is generally linked to population growth (and to some extent affluence). The Western Cape population is expected to grow by 6.2% between 2018 and 2023, and the CCT metropolitan area by 6.7% (Quantec, 2019). By 2023, the Western Cape is estimated to generate an additional 2 659 to 4 290 tonnes e-waste per year. As the most populous municipality, the CCT will also have the largest concentration of e-waste and is expected to increase to between 1 876 and 3 220 tonnes by 2023. Table 13 illustrates the provincial distribution of e-waste, estimated values, and the estimated tonnes per square kilometre⁵⁴.

Table 13: Distribution of e-waste generation in the Western Cape

Source: Using (Quantec, 2019) to project and infer (DEDAT, 2016) and (ERA, 2018)

Munic / Metro	2015 (actual)	2019 (projected)			2023 (projected)
	Total Generated (t/yr)	Total Generated (t/yr)	Concentration (t/km ²)	Value (Rs Million)	Generated (t/yr)
City of Cape Town	25 387 - 43 575	27 849 - 47 801	11,39 - 19,54	R35,0 - R75,1	29 725 - 51 021
Cape Winelands	8 355 - 7 470	5 709 - 8 131	0,27 - 0,38	R7,2 - R12,8	6 067 - 8 639
Central Karoo	405 - 623	456 - 640	0,01 - 0,02	R0,6 - R1,0	461 - 648
Eden District	787 - 4 980	3 875 - 5 213	0,17 - 0,22	R4,9 - R8,2	3 991 - 5 369
Overberg	1 789 - 2 490	1 866 - 2 714	0,15 - 0,22	R2,4 - R4,3	1 989 - 2 892
West Coast	2 322 - 3 113	2 837 - 3 409	0,09 - 0,11	R3,6 - R5,4	3 018 - 3 627
Western Cape	39 046 - 62 251	42 592 - 67 906		R53,5 - R106,7	45 251 - 72 196

Supply Chain

South Africa has more than 100 formally registered e-waste businesses and service providers along the e-waste supply chain (Lydall, et al., 2017). These companies are mostly involved in the early stages of the supply chain, with a few companies acting as points for consolidation or processing for export.

- Informal collection: There are more than 10 000 informal pickers engaged in e-waste collection, 2 000 of which are regular collectors. They collect a total of ~11 250 tonnes per year (ERA, 2018), which is about 25% of e-waste collected based on Lydall et al. (2017). This e-waste is sold to either formal and/or informal scrap dealers / buy-back centres.
- Formal collection: There are ~25 formal small- to medium-sized businesses engaged in e-waste collection. Each on average collects between 80 and 200 tonnes of e-waste per year. This amounts to between 2 000 and 5 000 tonnes per year (ERA, 2018).

- Consolidation: Aggregated e-waste is either refurbished⁵⁵ and/or dismantled and sold to larger pre-processors to be liberated, or for export. In addition to collectors, there are ~600 drop-off sites / buy-back centres (formal and informal) across South Africa. Collectively, they consolidate an estimated 3 600 tonnes a year (ERA, 2018).
- Pre-processing: There are currently seven known large-scale pre-processors in South Africa handling an estimated combined total of 17 500 tonnes per year of e-waste (ERA, 2018). These companies function as e-waste consolidators, collectors and dismantlers, but are primarily concerned with liberating material⁵⁶ from e-waste. The liberated streams are either exported or sent to processors, including Gauteng based Desco, SA Precious Metals, Sindawonye, Universal Recycling Company, and KwaZulu-Natal based Javco, Sibanye Recycling, and Sims Recycling.

⁵⁴ Minimum figures are inferred from ERA (2018) and maximum are projected and inferred from DEDAT (2016)

⁵⁵ 60% of revenue

⁵⁶ Streams can include iron and steel, copper, aluminium, plastic, PCBs, glass

- Processing: South Africa hosts only two local processors in Gauteng, i.e. SA Precious Metals and Rand Refinery, both of which focus on printed circuit boards (PCBs). These companies currently have a combined process capacity of 2 730 tonnes per year, and a total future capacity of 7 460 tonnes per year (Lydall, et al., 2017). They export recovered materials from the pre-processed components to offshore electronic manufactures.

In total, ~25 100 tonnes of e-waste are intercepted before landfill.

4.3.2. Opportunities

If a conservative range of between R1 257 and R1 571 per tonne of scrap e-waste (excluding higher value materials) is applied, then the low value of e-waste in the Western Cape is between R53.5 and R106.7 million per year, with the CCT metropolitan area holding the largest value of between R35.0 and R75.1 million. Opportunities include:

Intercepting e-waste before it reaches landfills

According to ERA (2018), of the ~425 000 tonnes of electrical and electronic equipment entering South Africa in 2018, ~360 000 tonnes are discarded as e-waste. Of this, only ~25 100 tonnes⁵⁷ (7%) are intercepted before landfill.

- Applying the extraction numbers of the 2019 projection of ~371 204 to ERA (2018), this leaves ~346 104 tonnes of e-waste to be collected, aggregated and processed nationally. This equates to a conservative value of ~R438 million that can be extracted.
- The five largest handlers of Western Cape e-waste source a total of 1 024 tonnes per year⁵⁸. Of this, 823 tonnes (80%) are information and communications technology (ICT) and consumer electronics, whilst the remaining 200 tonnes (20%) are small and large appliances. This equates to only 2.3% to 2.5% of the total e-waste generated in the Western Cape in 2018. The amount reaching scrap metal dealers is unknown, so too is the amount collected by the informal sector.

National pre-processing and processing Of the ~25 100 tonnes of e-waste intercepted in South Africa, only 2 730 tonnes are processed. With the planned expansion capacity by SA Precious Metals and Rand Refinery to reach only

⁵⁷ This excludes what is intercepted by the scrap metal industry

⁵⁸ This excludes what is intercepted by the scrap metal industry

7 460 tonnes a year, this leaves 22 370 tonnes that are presumably exported (notably to Germany, China and India). This creates an opportunity for local pre-processing and processing, if materials can be accessed and unlocked.

A licensed pre-processing / processing facility for the Western Cape

The Western Cape does not host any licensed pre-processing / processing facility as yet. Existing players (consolidators and dismantlers) are reluctant to diversify and expand in this sector, primarily due to regulatory requirements. They will be affected when the proposed IndWMPs are implemented, and subsequent volumes enter into the network, as only licensed facilities will be able to recycle/recover more than 500 kg a day.

New and existing players have an opportunity to capitalise on the void in the province and to apply for a waste licence. This will provide them with a head start of 8 to 18 months, depending on daily tonnages. Once they have waste licences, they will be able to accept large volumes of e-waste, in time for the implementation of IndWMPs.

The CCT metropolitan area is well placed to host a processor for three reasons:

- It is already an aggregation hub for e-waste for the Western Cape and other provinces.
- It generates between 65% and 70% (27 849 to 47 801 tonnes) of the Western Cape's annual e-waste, which equates to 11.39 to 19.54 tonnes per square kilometre in 2019.
- It plays host to the Atlantis SEZ for Green Technologies (see Section 6).
- It hosts an international shipping port.

Processing of South African Development Community feedstocks

South Africa is surrounded by a number of e-waste generating countries and potential sources of e-waste for processing. According to the United Nations University (2018), South African Development Community (SADC) countries collectively generated 569 100 tonnes of e-waste in 2016, of which 67 500 tonnes were generated by South Africa's immediate neighbours. Table 14 shows per capita generation and total estimated tonnages of e-waste generated per SADC countries, including South Africa's neighbours.

Table 14: E-waste generated for SADC in 2016

Country	Generated in 2016		
	Per Capita (kg/person)	Total (Tonnes)	
Angola	3.3	92 000	Non-Neighbours 180 600
Madagascar	0.5	14 000	
Malawi	0.5	9 500	
Mauritius	8.6	11 000	
Seychelles	11.5	1 100	
Tanzania	0.8	38 000	
Zambia	0.9	15 000	
Botswana	7.6	16 000	SA's neighbours 67 500
Eswatini	5.1	5 700	
Lesotho	0.9	1 800	
Mozambique	0.6	17 000	
Namibia	6.0	14 000	
Zimbabwe	0.9	13 000	
South Africa	5.7	321 000	
Total SADC		569 100	

4.3.3. Drivers / Enablers

In addition to the drivers and enablers mentioned in Section 2.4, the main market drivers and enablers for e-waste include:

National e-waste landfill ban

The national norms and standards for the assessment of waste-for-landfill disposal (R. 636 of 23 August 2013) provides a list of waste streams to be banned from landfill at certain dates (see Figure 10). This list required hazardous lamps to be banned in August 2016. However, as of August 2021, all other hazardous e-waste will be banned. This will require municipalities to implement the ban and ensure that e-waste is excluded from disposal to landfill.

National battery landfill ban

The list of waste streams to be banned from landfill (see Figure 10) mentioned above also required that lead acid batteries were banned as of August 2013.

This list will require that all other batteries be banned from landfill as of August 2021. As the demand for renewable energy generation is growing, so too will the demand for storage and subsequently battery storage. Such growth will require solutions to future battery waste.

E-waste Extended Producer Responsibility Growth in the sector should be driven through the implementation of EPR. Although the Minister of Environment, Forestry and Fisheries has withdrawn the call for the electrical and electronics industry to develop IndWMPs, she is likely to implement EPR measures (see Section 3.3). EPR is expected to inject investment into public education and awareness, growth of existing collectors, consolidators, liberators, pre-processors, and processors, and into the establishment of new ones. The EPR should also facilitate the development of local end-markets for liberated material. Lastly, the EPR should result in better data collection of both local and imported e-waste.

Operation Phakisa

The Chemical and Waste Economy Phakisa (see Section 2.6) has designated two initiatives to focus exclusively on e-waste. Initiative 6 focuses on the establishment of extended producer responsibility as noted above for e-waste to unlock funds. Initiative 7 is focused on unlocking specifically government ICT legacy volumes to be made available to the private sector. Both initiatives should facilitate unlocking the availability of both private and public sector e-waste.

4.3.4. Risks / Barriers

In addition to the ones mentioned in Section 2.5, specific risks and barriers include:

Delay in EPR rollouts

As noted in Section 2.6., the implementation of the IndWMPs has been met with delays even before the Section 28 notice was gazetted in December 2017. Now that the Section 28 notice has been withdrawn and Section 18 EPR measures are being contemplated, there is no definite time frame of when EPR will be implemented in South Africa. As such, investors and businesses looking to capitalise on the opportunities associated with e-waste should be aware of potentially further delays.

Lack of reliable data

There is still a paucity of reliable data on the types, rates and tonnages of e-waste generated in South Africa. E-waste data collection is in its infancy, and is largely based on assumptions and extrapolations. Only until the IndWMPs are implemented and coordinated correctly, will a mature system be available to ensure valid and updated numbers. Further to this, scrap-metal dealers often intercept large e-waste derived materials, which can often be misreported. This makes it difficult to provide accurate e-waste numbers, as they are recorded as generic scrap metal.

Access to feedstocks

South Africa has extensive collection and aggregation networks, as well as the technological means and capacity to process e-waste. Due to the lack of access to feedstock, these facilities are generally not running at capacity. This can be attributed to insufficient drop-off points and 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 e-waste (Lydall, et al., 2017).

Expensive licensing of e-waste recycling / recovery

E-waste is defined as a hazardous waste and is regulated accordingly. These regulations limit recycling and recovery of e-waste to less than 500 kilograms per day, otherwise an EIA process is required to obtain a waste management licence. This process has financial implications (especially in terms of affordability by SMEs) and could lead to time delays, depending on the EIA process (see Section 3.1).

Cherry-picking of high value e-waste

Certain e-waste streams cost more to collect and recycle than the income that can be generated. As such, many collectors focus on high-value streams, such as ICT and consumer electronics, whilst ignoring low-value streams. This should change with the introduction of IndWMP levies, as these low-value streams will likely be subsidised by the more high-value streams. In the meantime, it is an ongoing issue for many collectors.

As indicated earlier, according to ERA (2018), South Africa generates roughly 7 000 to 10 000 tonnes a year of Printed Circuit Boards (PCBs). With SA Precious Metals and Rand Refinery having a combined future processing capacity of 7 460 tonnes per year for PCBs, it is unlikely that there is space in the market for an additional processor of PCBs.

DEFF view of transboundary e-waste movement

Concerns are expressed nationally that South Africa may become a “dumping ground” for e-waste. Thus there is some uncertainty as to what the regulatory response may be. Consequently, it is as yet uncertain what the likelihood is of transboundary movement of e-waste, and hence South Africa’s ability to access foreign e-waste to enable economies of scale.

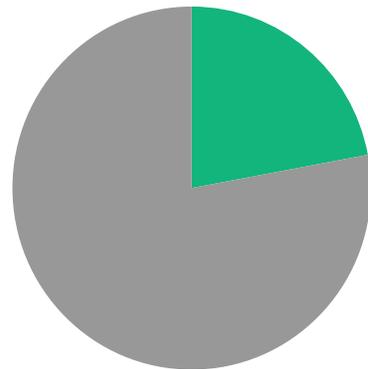
4.4. Builders' rubble

Builders' rubble is a mineral material component of construction and demolition waste, and is comprised of fired clay brick, concrete, and mortar. Such material is usually generated through demolition activities and as wastage on construction sites. Builders' rubble makes up typically the largest waste stream generated in the Western Cape. This material stream may be segregated at the point of generation or segregated offsite, in which case it is better named "recovered aggregate". This can be used in, among other applications, roads and foundations.

4.4.1. Market overview

Builders' rubble generated

Builders' rubble generated in South Africa in 2017 was estimated at 5.36 million tonnes by the then DEA (2018). However, based on extrapolation using a correlation between GDP⁵⁹ and rubble



Total Waste - 7 714 303 Tonnes / 2015

22 % ■ Construction and Demolition
78 % ■ Non-Construction and Demolition

Figure 20: Construction and demolition waste generated in the Western Cape in 2015

Source: DEDAT,(2016)

Figure 21 provides an update of the tonnages of builders' rubble received and recorded by the CCT's landfills between the years 2016/17 and 2018/19. In 2017/18, the CCT received ~1.24 million tonnes of builders' rubble at its landfills. This was reduced considerably to ~0.41 million tonnes in 2018/19. The reduction in rubble entering landfill was marked from 1 July 2019 due to the introduction of a gate fee of R20 per tonne (excl. VAT) applied to clean builders' rubble entering CCT landfills. Clean rubble was previously accepted free of charge. A further factor over the last two quarters of 2019 was the decline in the local construction industry, although there were early signs of a recovery in the last quarter.

Extrapolating from the ~64%⁶⁰ of the rubble generated in the Cape Town municipal area, the Western Cape figure for rubble stockpiled at landfill in 2018 is estimated at 1.88 million tonnes, or 19% of the estimated total rubble generated in South Africa⁶¹.

recorded at landfills in the Western Cape, this figure may be as high as ~8.7 million in 2017 and ~9.0 million in 2018.

Figure 20 shows the proportion of construction and demolition waste to waste generated in the Western Cape. Material reported as construction and demolition waste at landfill is largely builders' rubble with varying levels of contamination. Construction and demolition waste is generated in large volumes, typically in metropolitan municipalities where development is more rapid and consistent, and where brownfield developments are more prominent than greenfield developments. As such, the amounts of construction and demolition waste vary between municipalities. Annex A provides a detailed breakdown of construction and demolition waste per district municipality, and subsequently an indication of the amount of builders' rubble as well.

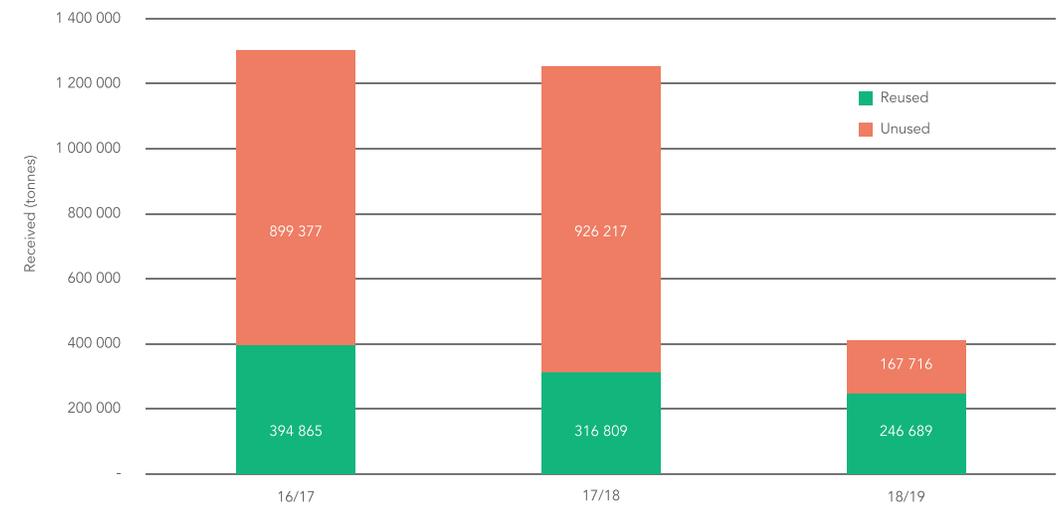


Figure 21: Builders' rubble received by CCT's landfills between 2016/17 and 2018/19

Source: CCT

Value of available recovered aggregate

Nationally, the potential market for the collection, processing, and sale of recovered aggregate is presently nine million tonnes per year⁶². It has been estimated that 25% of rubble entering the CCT landfills⁶³ may be suitable for sub-base (G5) if not base course material in road construction. The average 2019 price of G5 virgin aggregate is ~R155 per m³ (incl. VAT). As such, the value of sub-base material generated in South Africa in 2018 is estimated at R218 million, using 2019 prices. The Western Cape had ~1.7 million tonnes of builders' rubble available in 2019, with only 30% to 40% at best currently processed and reused. The overall value of builders' rubble in the Western Cape equates to ~R48 million in material value, assuming a 65:35 proportion of sub-base to fill material sold.

Outlook for the construction industry

In South Africa, civil works, which is primarily dependent on public sector spend, accounts for the majority of gross fixed capital formation (GFCF). Residential and non-residential building each accounts for about a third of the GFCF of civil works. Figure 22 illustrates the GFCF and forecast of construction sector growth. Residential building is forecast to grow at 1.5% in 2020 and 2.0% in 2021. Non-residential building and construction works are forecast to contract by 1.8% and 2% from 2019, which represents a slowing of the contraction trend. Non-residential building is expected to register positive growth of 1% in 2021, while construction works are forecast to experience a further 1% contraction in 2021 (cibd, 2019).



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⁶² Estimated based on the correlation between GDP associated with the construction sector and rubble tonnage. Builders' rubble generated in 2017 is reported as 5.3 million tonnes (DEA, 2018); however, this figure does not include the material processed in the private sector.

⁶³ Can be extrapolated to South African metros where the majority of builders' rubble is generated.

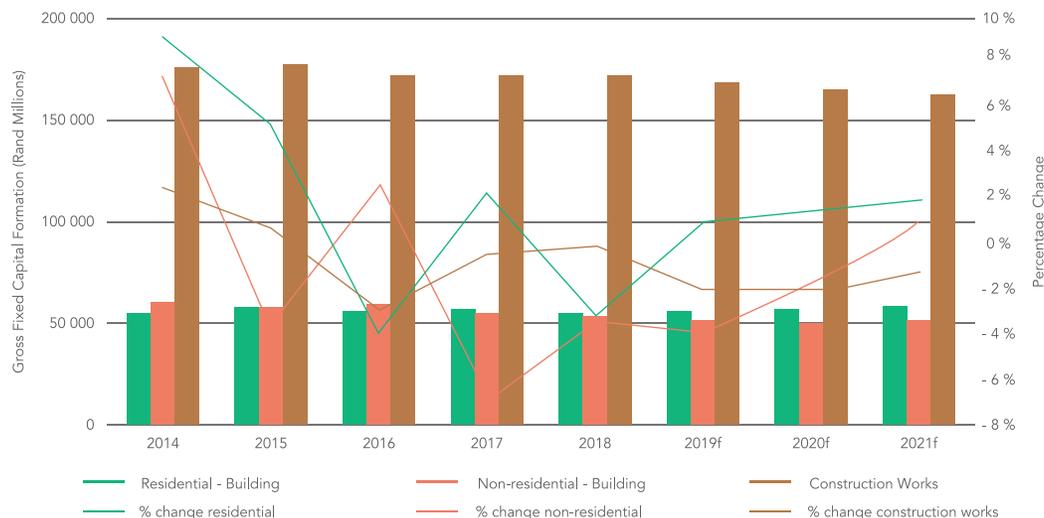


Figure 22: Gross Fixed Capital Formation and forecast of construction sector growth

Source: cidb (2019), as based on Industry Insight's data

Gauteng, the Western Cape, the Eastern Cape and KwaZulu-Natal are the top four performers in terms of the value of the construction sector. At 26%, Gauteng accounts for the largest proportion of construction value-add, whilst the Western Cape accounts for 21%, and the Eastern Cape and KwaZulu-Natal account for 15% (cidb, 2019). The future supply of recovered aggregate is directly linked to the value and potential growth of the construction sector.

4.4.2. Opportunities

There are opportunities for rubble crushing companies, as well as the demolition and construction sector in the supply and application of builders' rubble in construction. The processing capacity and market for recovered aggregate is currently the most mature in the Western Cape, with the CCT being the focus of activity, and Gauteng registering rapid growth in the sector. The KwaZulu-Natal market supports few crushing companies, but increased interest in recovered aggregate is being recorded in the province.

Concentration of material supply

The supply of material may be relatively diffuse, and certain volumes are required to justify processing of material for a high-quality product. The metropolitan municipalities, being hubs of construction activity and population density, would therefore be key areas for builders' rubble generation. Based on the value of building plans passed between January and August 2019, KwaZulu-Natal, Gauteng and the Western Cape account for 81% of the value of plans passed in

the country. StatsSA (2019) indicates that the CCT, City of Johannesburg, City of Tshwane and eThekweni metropolitan areas are best sources of feedstock for rubble crushing operations; as well as, a more likely off taker.

Operation Phakisa

Builders' rubble is one of the 20 focus areas of Operation Phakisa. The rubble Phakisa project falls under the municipal work stream, and to that end a request for information has been sent to all municipalities regarding the builders' rubble tonnages landfilled or stockpiled at waste sites in the municipality, as well as any handling or processing of the material by the municipality or their contractors. This information will be used to select regions for support and funding in setting up builders' rubble sorting and processing facilities across the country.

Municipal Tenders

The CCT will be publishing a new builders' rubble crushing tender in the third quarter of 2020, following the first tender cycle of three years. The contractor will be required to crush rubble stockpiles at the landfill, as well as new incoming material for application at CCT landfills and for sale to the private sector. The Stellenbosch Municipality is also likely to publish a new crushing tender at its Devon Valley Landfill in 2020. Saldanha Bay Municipality is in the planning phase for a rubble crushing tender at municipal sites.

4.4.3. Drivers / Enablers

The growth in the recovered aggregate sector is driven by market demand, with no external drivers such as high landfill fees or virgin material taxes, for example. This is in contrast with more developed global markets that rely on external instruments for uptake. In addition to the drivers and enablers mentioned in Section 2.4, the main market drivers include:

Lower cost of logistics

A driver for the market in recovered aggregate is rising logistical costs. To reduce cost, recovered aggregate may be generated and made available closer to the point of application than virgin aggregate, which is typically transported from outside urban centres.

Lower material and production costs

Recovered aggregate is typically produced at a lower cost than virgin aggregate, which is extracted and processed in large plants with high capital costs and high energy demand. Recovered aggregate is generally processed in smaller, if not mobile plants, resulting in lower energy demand. The recovered aggregate sector is also labour inclusive in the handling and sorting of material, such that there is substitution of labour for energy. As a result, the virgin aggregate price is on average 1.3 to 1.7 times that of recovered aggregate in the CCT⁶⁴.

Furthermore, the Carbon Tax Act (see Section 3.2) has implications for the cement and asphalt industries, both of which supply road building material. Such taxation is likely to trickle down the value chain and passed on to the consumer. This will subsequently increase the price of virgin material. This should encourage the application of cheaper secondary materials.

Performance

With growing industry application of recovered aggregate, there is increasing confidence in the quality of the aggregate and the performance achieved. This is further to be driven by guidelines for applications and the recovered aggregate trials.

4.4.4. Risks / Barriers

In addition to the general risks and barriers mentioned in Section 2.5, the drivers below pertain to builders' rubble specifically:

Lack of uptake by public sector roads' authorities

Unlike more developed markets such as the Netherlands and Japan, South Africa experiences a lack of builders' rubble uptake as input into road construction. This is related to the absence of specifications for road building aggregate, including secondary materials. This is further exacerbated by the reluctance of engineers to specify alternative materials. Although required aggregate performance has been demonstrated for recovered aggregate in roads, the majority of the industry is not yet convinced of the durability of the material under local conditions and long return periods for road maintenance in South Africa.

4.4.5. Recent developments

CCT Gate Fee implementation:

The CCT has increased its builders' rubble gate fee from R20 per tonne (excl. VAT) in 2018/19 to R21.04 per tonne (excl. VAT) for the 2019/20 financial year. In 2010/11 the CCT applied a landfill gate fee of R50 per tonne (excl. VAT) for construction and demolition waste. This gate fee increases the overheads for construction and demolition, and subsequently resulted in an increase in dumping, which costs the CCT a great deal in cleansing. The CCT consequently did away with a gate fee in 2013/14 for clean builders' rubble. This clean builders' rubble was then stockpiled for crushing. The difference in 2019/20 is that Cape Town has a handful of private sector crushing solutions that are cheaper than landfill so the industry has options other than landfill, but it is not yet clear what the impact is on the extent of illegal dumping or the diversion of waste away from the appointed crushing contractors at the CCT landfills.

President Ramaphosa's 'Infrastructure Deal'

The Infrastructure Fund announced by the South African President in September 2018 will be incubated by the Development Bank of Southern Africa (DBSA), as announced at South Africa's second Investment Conference in November 2019 (Ramaphosa, 2019). Government has committed to making R100 billion available over 10 years, which will be used to attract investment from development and commercial banks, asset managers and other financial institutions. The Investment and Infrastructure Office headed by Dr Kgosietsi Ramokgopa has been set up to

⁶⁴ These prices are those quoted for collection of product from the quarry or crushing company; logistics costs are therefore not represented.

oversee and co-ordinate investment and the focus on infrastructure development, with the focus on removing barriers to the process. Such infrastructure investment could see an increase in the demand for secondary material depending on the factors that affect uptake as outlined earlier.

Sustainability and the Roads' Industry

The National Roads Policy is currently being revised. The public commenting process was concluded in April 2018. It is likely that the requirement for "all Road Authorities to develop a 'green' road network that conforms to the principles of sustainability" will be retained. The policy includes a commitment to develop a green rating tool applicable to all roads built and rehabilitated in South Africa, as well as criteria related to materials, with the use of appropriate secondary (or reclaimed) materials improving the green rating of a road.

The drive towards sustainability in the roads sector gained further momentum at the Conference on Asphalt Pavements for Southern Africa 2019. The conference resolutions agreed that "the Sustainable Roads Forum, or a body like it, facilitate industry-wide conversation on the process needed to embed sustainability (social, economic and environmental) in the roads industry in South Africa".

Guidelines for application of secondary materials in roads

The development of guidelines for the application of secondary materials in roads was initiated by a resolution of the Road Pavement Forum in May 2016. The Recovered Materials Working Group (RecMat) is likely to publish these guidelines for comment in June 2020. In addition to builders' rubble, it is expected that other secondary materials will also be included in these guidelines as research progresses.

In a separate initiative to guide the use of secondary material in roads, recovered aggregate is being tested in a number of trial sections of road. Relevant data specifications for road building aggregate, as well as performance test results on the aggregate, are being recorded by the RecMat committee. A database is also being developed to include information on the road sections. This national resource comprises information on the road building material prior to application; information on design and any stabilisation of recovered aggregate material; and where possible, visual inspection and performance data during use.



5

Funding and Incentives

A range of general and sector-funding solutions and incentives is available to investors, manufacturers and service companies in the green economy.

It covers international sources, such as Development Finance Institutions (DFI), local funding pools including the public and private sector, and a considerable range of tax incentives.

5.1. General database web page

The GreenCape Finance Desk hosts a web page⁶⁵ with a number of Green Finance resources that cover funding and incentives available to companies in the green economy. A few of the available database are highlighted below.

5.1.1. Green Finance Database

In conjunction with the South African National Energy Development Institute (SANEDI), GreenCape maintains a database of funding sources and primarily dti-driven incentives that may be relevant to green economy investors. The database contains information on more than 100 funding opportunities, including an overview of the opportunity and its 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 online⁶⁶.

5.1.2. Government funding and incentives database

An updated document focused on South African government funding and incentives is available to view and download online⁶⁷.

5.1.3. Finfind database

Finfind⁶⁸ is an innovative online finance solution that brings together SME finance providers and finance seekers. With a focus on finance readiness, Finfind has more than 200 lenders and over 350 loan products available to SMEs. The database is ideal for South African SMMEs who are seeking funding and/or business advisory services, and those who want to improve their understanding of finance.

5.1.4. AlliedCrowds database

AlliedCrowds⁶⁹ 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). In addition:

- Themed databases around the Sustainable Development Goals (SDGs) and the World Green Economy Organisation (WGEO) are available.
- Reports, including a number specifically about African funding sources, can also be downloaded for free.
- You can also contact Allied Crowds to create a customised funding database for you. This resource is ideal for any entity seeking a broad range of financial solutions on a global scale.

⁶⁵ <https://www.greencape.co.za/content/focusarea/green-finance-databases>

⁶⁶ <https://www.greencape.co.za/assets/Uploads/GreenCape-Finance-Database-v6.xlsx>

⁶⁷ <https://www.greencape.co.za/assets/Uploads/Government-Funding-and-Incentive-Booklet.pdf>

⁶⁸ www.finfindeasy.co.za

⁶⁹ <https://alliedcrowds.com/>



6 Support for waste sector start-ups

Support for waste sector start-ups

Table 15 provides a list and descriptions of waste-specific funding and support solutions.

Table 15: List of funding solutions and incentives – waste-specific

Company	Munic	Contact
DEFF	Financial support through grant funding is provided by the DEFF through its Recycling Enterprise Support Programme (RESP). The programme targets emerging enterprises in the waste recycling sector that represent historically disadvantaged persons. The grant includes a maximum of R5 million per project, and will seek to support at least two companies per province. The call for support is usually made public in the middle of year via the DEFF's website (www.environment.gov.za/procurement/tenders).	Prince Radzuma E: PRadzuma@environment.gov.za Tel: 012 399 9806
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.	Belinda Booker E: belinda.booker@petco.co.za Tel: 011 615 8875 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.	Lisl Liedemann E: lisl@polyco.co.za Tel: 021 276 2096 Website: www.polyco.co.za



7

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. In 2017, Cape Town was 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 Atlantis Special Economic Zone (SEZ) for Green Technologies.

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.



Atlantis Special Economic Zone for Green Technologies

The Atlantis SEZ is a zone dedicated to the manufacturing and provision of services in the green technology space - technologies that reduce or reverse the impact of people on the planet. Wind turbines, solar panels, insulation, biofuels, electric vehicles, materials recycling and green building materials are all examples of green technologies that will be welcomed to the zone.

The zone welcomes manufacturers, service providers, suppliers and other players in the value chains of different green technologies.

The SEZ is situated in the Atlantis industrial area north of Cape Town, south of Wesfleur, east of Dassenberg Road, and west of the Witsand community.

Why invest in the Atlantis?

There are strong and growing South African and African markets for greentech. The South African greentech manufacturing market is worth at least R30bn; with a growing greentech market in the neighbouring countries. South Africa has opportunities in energy, waste, agriculture, transport and other sectors and is a great entry point for the SADC market.

Atlantis is a great location and development ready. 93 hectares of zoned City of Cape Town land is available for leasing to investors. Bulk infrastructure is in place and Atlantis has new public transport and shipping links and fibre connectivity. Atlantis is also close to major ports, roads, universities and greentech markets.

Investors have access to extensive investment support through the One Stop Shop for investor support and the rest of the investor support ecosystem, which includes InvestSA, GreenCape, the City of Cape Town, and Wesgro. Together the ecosystem provides information and advocacy; market intelligence; facilitated access to permits and licenses, planning and development approval; and skills training.

Investors and tenants are accessing attractive incentives in the form of tax relief and allowances, employment tax incentives, fast-tracked development approvals, fee exemptions and subsidies.

There is an attractive, wide-ranging skills base to recruit from with 5 universities and many more colleges in the province, and a large range of unskilled, semi-skilled, technical and professional candidates.

For more information, contact the SEZ's: interim Chief Executive Officer, Pierre Voges
pierre@wesgro.co.za



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8

GreenCape's support to businesses and investors

GreenCape is a non-profit organisation that works at the interface of business, government and academia to identify and remove barriers to economically viable green economy infrastructure solutions. Our vision is a thriving prosperous Africa, mobilised by the green economy.

Working in developing countries, GreenCape catalyses the replication and large-scale uptake of green economy solutions to enable each country and its citizens to prosper.

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.

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 nearly 63,000 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 23 below shows the different focus areas within each of our programmes.

Benefits of becoming a GreenCape member

We currently have over 1100 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.

9 Annexes

Annex A: Western Cape Waste Tonnes

Total waste tonnages generated per district municipality / metropolitan city in 2015

Material	Western Cape	City of Cape Town	Cape Winelands	West Coast	Overberg	Central Karoo	Eden
Municipal Solid Waste	2 387 353	1 671 146	286 482	119 368	95 495	23 874	190 988
Organic	489 293	342 505	58 715	24 465	19 572	4 893	39 143
Paper	295 214	206 649	35 426	14 761	11 809	2 952	23 617
Plastics	222 741	155 919	26 729	11 137	8 910	2 227	17 819
Glass	163 370	114 359	19 604	8 168	6 535	1 634	13 070
Metals	531 258	371 880	63 751	26 563	21 250	5 313	42 501
Non-recyclable	685 477	479 834	82 257	34 274	27 419	6 855	54 838
Industrial	528 661	382 451	59 386	23 708	18 324	2 585	42 206
Organics	105 732	76 490	11 877	4 742	3 665	517	8 441
Non-organics	422 928	305 961	47 508	18 967	14 659	2 068	33 765
Commercial	352 440	254 968	39 590	15 806	12 216	1 723	28 138
Organics	193 842	140 232	21 775	8 693	6 719	948	15 476
Non-organics	158 598	114 735	17 816	7 113	5 497	775	12 662
Construction & Demolition	1 704 680	1 090 995	272 749	85 234	85 234	17 047	153 421
Tyres	18 111	12 678	2 173	906	724	181	1 449
Wet sewerage sludge	295 023	190 995	39 846	19 525	12 691	3 530	28 436
Agricultural residues	2 125 083	46 557	277 731	885 118	507 462	15 821	392 394
Volatile Animal Waste	149 680	11 226	22 452	28 065	24 323	18 710	44 904
Forestry residues	91 021	9 102	4 551	4 551	9 102	0	63 715
E-waste	62 251	43 575	7 470	3 113	2 490	623	4 980
Total	7 714 303	3 713 693	1 012 430	1 185 394	768 061	84 094	950 631

Source: (DEDAT, 2016)



① Renewable Energy

Utility-scale projects, localisation of component manufacturing, incentives & financing options, wheeling & energy trading.

② Energy Services

Energy efficiency & embedded generation, electric vehicles, alternative basic electrification, incentives & financing options.

③ Electric Mobility

Electric vehicles and financing options.

④ Alternative Waste Treatment

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

⑤ 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.

⑥ Water

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

⑦ Sustainable Agriculture

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

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

Figure 23: GreenCape's focus areas

Support 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).

Annex B: CCT 2018 Waste Characterisation

In 2018, JG Afrika (formally Jeffares and Green) were appointed by the CCT to undertake a waste characterisation assessment at six of its waste aggregation sites over a given period, and subsequently to extrapolate this across all CCT facilities.

Material		Fraction	
Packaging / Recyclable	Paper	13.23%	
	Cardboard		
	Glass	3.80%	
	Plastics	Soft	7.16%
		Hard	7.13%
	Tetrapak	0.53%	
	Multilayer	1.60%	
	Metals	1.97%	
Hazardous	E-waste	0.34%	
	Hazardous	Cleaning, toiletries	0.07%
		Fluorescent bulbs	0.001%
		Batteries	0.001%
	Nappies	6.75%	
Organics	Food Waste	Mixed	8.51%
		Liquids	0.44%
		Starches	0.56%
		Dairy	0.03%
		Fruit / Veg	4.45%
		Meat	0.53%
	Residual organics	5.94%	
	Garden waste	7.37%	
Other	Residual	Remaining fraction	18.80%
	Textile	6.38%	
	Other	1.50%	
	Construction	1.68%	
	Wood	1.25%	

Source: (CCT, 2018)

Annexure C: Key Contacts

Associations	Email	Tel	Website
ARO	africanreclaimers@gmail.com	-	www.facebook.com/africanreclaimers
Collect-a-Can	jenette@collectacan.co.za	+27 11 466 2939	www.collectacan.co.za
ERA	erainfo@eranpc.co.za	+27 32 947 0165	www.eranpc.co.za
EWASA	info@ewasa.org	+27 31 535 7146	www.ewasa.org
IWMSA	info@iwmsa.co.za	+27 11 675 3462	www.iwmsa.co.za
LightCycleSA	info@lightcyclesa.org	+27 12 880 2161	www.lightcyclesa.org
MetPac	info@metpacsa.org.za	+27 82 880 9580	www.metpacsa.org.za
ORASA	Info@orasa.org.za	+27 83 696 5138	www.orasa.org.za/
PackagingSA	liza@packagingsa.co.za	+27 12 001 1914	www.packagingsa.co.za
PASA	info@polystyrenesa.co.za	+27 72 820 2506	www.polystyrenesa.co.za
Petco	info@petco.co.za	+27 21 794 6300	www.petco.co.za
PlasticsSA	Karen.Wichman@plasticssa.co.za	+27 11 314 4021	www.plasticsinfo.co.za
Polyco	lisl@polyco.co.za	+27 21 276 2096	www.polyco.co.za
RecMat	Kirsten@greencape.co.za	+27 21 811 0250	-
RecyclePaperZA	info@pamsa.co.za	+27 11 803 5063	www.recyclepaper.co.za
Rose Foundation	info@rosefoundation.org.za	+27 21 448 7492	www.rosefoundation.org.za
SABIA	secretary@biogasassociation.co.za	-	-
SAEWA	envirosense@xsinet.co.za	+27 21 706 9829	www.sa.ewastealliance.co.za
SAPRO	lisa@plasticrecyclingsa.co.za	+27 83 406 3298	www.plasticrecyclingsa.co.za
SAVA	info@savinyls.co.za	+27 87 087 0418	www.savinyls.co.za
SAWPA	-	-	www.facebook.com/SAW-PAZA
TGRC	info@tgrc.co.za	+27 11 463 5644	www.theglassrecycling-company.co.za

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