GreenCape

2022 WASTE MARKET INTELLIGENCE REPORT

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	Biosolids Beneficiation Facility
C&D	Construction and Demolition
CCT	City of Cape Town Metropolitan Municipality
COPCO	Compostable Plastics Council
CPU	Central Processing Unit
CSIR	Council for Scientific and Industrial Research
EAP	Environmental Assessment Practitioner
EAPASA	Environmental Assessment Practitioners Association of South Africa
EIA	Environmental Impact Assessment
EPR	Extended Producer Responsibility
EWASA	e-Waste Association of South Africa
DEA&DP	Department of Environmental Affairs and Development Planning
DFFE	Department of Forestry, Fisheries and the Environment
FERTASA	Fertilizer Society of South Africa
FFFARSRA	Fertilizers, Farm Feeds, Agricultural Remedies and Stock Remedies Act
GDP	Gross Domestic Product
GWIS	Gauteng Waste Information System
HDPE	High-density polyethylene
IDP	Integrated Development Plan
IndWMP	Industry Waste Management Plan
IPPA	Independent Power Producers Association
IPWIS	Integrated Pollutant and Waste Information System
IWMF	Integrated waste management facility
IWMP	Integrated Waste Management Plan (Waste Sector Plan)
LDPE	Low-density polyethylene
MBT	Mechanical biological treatment
MIR	Market Intelligence Report
MRF	Material recovery facility
MSW	Municipal Solid Waste
MWe	Megawatts Electic
NCPC-SA	National Cleaner Production Centre of South Africa
NEMA	National Environmental Management
NEMWA	National Environmental Management Waste Act (The Waste Act)
NEMAQA	National Environmental Management: Air Quality Act
NWMS	National Waste Management Strategy (2020)
OPRL	On-pack recycling label
ORASA	Organic Recyclate Association of South Africa
PAYT	Pay-As-You-Throw
PCB	Printed circuit board
PET	Polyethylene terephthalate
PRO	Producer Responsibility Organisation
RDF	Refuse derived fuel
RTS	Refuse transfer station
SA	South Africa
SABIA	Southern African Biogas Industry Association
SAFLWVA	South African Food Loss and Waste Voluntary Agreement
SAPRO	South African Plastic Recycling Organisation
SAWIS	South African Waste Information System
SMME	Small, medium, micro enterprise
SSEG	Small scale embedded generation
SoWR	State of Waste Report (National)
WC	Western Cape

WEEE Waste electrical and electronic equipment
WWTW Wastewater Treatment Works

Exchange rate used:

1 US Dollar = R15

EXECUTIVE SUMMARY

The South African waste management and beneficiation landscape has been bolstered with the publication of South Africa's new National Waste Management Strategy (2020); as well as implementing several key and progressive regulatory changes.

Furthermore, the City of Cape Town as a municipality is implementing its long-term Waste Sector Plan and shorter-term Integrated Waste Management Plan in line with its waste policy and planning and will make substantial investments into material recovery, notably in recyclables and organic waste streams.

The private sector has also played its part with large brands making progressive commitments to voluntary agreements, committing to implementing extended producer responsibility, and leveraging government's red-tape reduction efforts. These should all ultimately unlock opportunities in, among others, the plastics, organics, and electronic waste sectors. These opportunities should be open to not just large established businesses, but small, medium and micro-sized enterprises (SMMEs) too. However, the greatest opportunity will likely be in organic waste.

As such, much of the focus of this MIR is on organic waste. In 2015, the most recent year for which waste data is available at a provincial level for all streams, the Western Cape (WC) generated over 7.7 million tonnes of waste, of which ~2.4 million tonnes (31%) consisted of municipal solid waste (MSW), ~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.

As the economic hub of the province, the Cape Town metropolitan area generates a substantial portion of the WC's waste. In 2015, this included: ~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.

In 2020, a total of ~1.7 million tonnes of waste were landfilled in Cape Town. The City of Cape Town (CCT) landfilled ~1.1 million of this, whilst the private sector landfilled ~600 000 tonnes. With innovative solutions emerging in Cape Town, coupled with deregulation and large public and private investments expected the opportunities within the organics, plastic and e-waste sectors have the total potential to add between R320 million – R5 billion in value to the Cape Town economy each year. The wide range in value-add potential is due to the wide variations associated with material types, end products produced, and the variations between and within solutions.

Opportunities associated with the waste streams currently landfilled in Cape Town:

Organics: It is estimated that the WC generated between 759 000 – 868 260 tonnes of urban related (MSW, commercial and industrial) organic waste in 2020. The Cape Town metropolitan area was expected to have generated between 538 050 – 619 760. However, based on what was landfilled, the CCT landfilled ~301 780 tonnes and the private landfill landfilled ~83 490 tonnes in 2020. This landfilled waste has a value-add potential of R16.7 million – R3.2 billion per year.

Plastics: It is estimated that the WC generated between 214 307 – 245 103 tonnes of MSW plastics alone in 2020. Assuming these plastics streams were made available, the plastics would have a value of between R321 million – R2.2 billion. At a municipal level, the greatest value lies in the Cape Town metropolitan area, with a projected estimated value of between R225 million – R1.5 billion. However, based on the landfilled numbers, the CCT landfills ~154 471 tonnes and the private landfill landfills ~42 870 tonnes.

This results in a range of potential value of R297 million – R1.8 billion per year.

E-waste: The WC is estimated to have generated between 43 290 – 68 501 tonnes of e-waste in 2020. The market value is estimated at between R55.2 – R109.8 million per year. At a municipal level, the greatest value lies in the Cape Town metropolitan area, with an estimated market value of between R36.5 – R77.4 million. However, based on actual landfilled numbers of ~3 697 tonnes at CCT landfills and ~1 026 tonnes landfilled at the private landfill, this value is between R6.1 – R7.6 million per year.

Municipal Tenders: To deliver on its strategic deliverables, the CCT has drafted a pipeline of large infrastructure initiatives. The CCT will likely outsource the delivery of these initiatives in part or in full to the private sector via regulated procurement. This pipeline could be used by the private sector, including SMMEs, to inform future implementation / expansion plans.

Several key drivers of these opportunities include:

Increasing cost of disposal: Rising waste management costs are pushing up the price of landfilling in the WC, and in the Cape Town metropolitan area. This increases demand from waste generators for alternative waste treatment solutions, which improves the business case for solutions.

Low landfill airspace: Most of the WC province is experiencing landfill airspace pressures. Of the 25 municipalities, 22 have less than five years of airspace left. This is expected to continue in the medium term. Pressures like these provide opportunities for municipalities to diversify their waste management models, as is particularly evident in Cape Town.

Legislation and regulation: New national and provincial legislation and regulations are unlocking several key waste streams, notably organics, plastics, and e-waste.

These changes will 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.

Mandatory extended producer responsibility: Producers of paper, packaging and some single-use products, lighting equipment, and electrical and electronic equipment were required to join or develop and implement extended producer responsibility measures by 5 November 2021. Levies raised through extended producer responsibility (EPR) will support access to feedstocks and support demand for recovered materials in the associated waste streams.

Climate Change: To address climate change, the CCT developed its Climate Change Action Plan that includes several waste-related goals. This, in turn, has informed the key investments and initiatives imbedded in the City of Cape Town's Integrated Waste Management Plan 2022-2027, due for release in the first quarter of 2022.

Policy and Strategies: Both national government and the City of Cape Town have developed progressive waste-related strategies and action plans. These include the City of Cape Town's Waste Sector Plan, which is informed by the National Waste Management Strategy. These strategic documents provide insights into where opportunities within waste lie.

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. These initiatives are essentially embedded in the 2020 National Waste Management Strategy.

Private sector commitments: Some of South Africa's largest brands have made progressive voluntary commitments that should increase the supply and demand for plastic waste and organic waste solutions.

WHAT'S NEW?

For investors and business owners who read GreenCape's 2021 Waste MIR, the following are new developments discussed in this report:

- Updated trends in the beneficiation of plastics and e-waste.
- More specific opportunities in the organic waste beneficiation in the Cape Town metropolitan area.
- Inclusion of the recently drafted and highly informative CCT Integrated Waste Management Plan.
- Update of the project pipeline of existing and future CCT contracts related to material recovery and/or beneficiation.
- Update on extended producer responsibility for the paper, packaging and some single-use products, electrical and electronic equipment, and lighting.
- Brief update on the Chemical and Waste Phakisa.

Table 1: Summary of waste value-add opportunities

Theme	Opportunity	Driver	Enabler	Barrier / Risks	Term	Macro Context
Organics	**CCT Extracted Organics** **Available:** ~300 835 tonnes per year. **Value potential:** R10.6 million – R2.2 billion.	• Limited municipal landfill lifespan. • Cost of operating landfills. • Climate change mitigation.	• NWMS organic waste targets. • CCT waste sector plan investments. • Organic waste related landfill bans. • Increasing landfill gate / tipping fees. • Organic waste treatment regulations. • Carbon financing appetite. • Food loss and waste commitments. • Industry association support. • Electricity generation / procurement.	• Low cost of landfilling (until 2027). • Inadequate source separation. • Strict end product regulations. • Sensitive off-takers for by-products. • Short / strict municipal procurement. • CCT landfill gas carbon credit programme. • Lack of bio-based heat off-takers. • Low confidence in bio-energy projects.	M-L	• NWMS focus on organic waste. • Operation Phakisa focus on organics. • Greenhouse gas reduction commitments. • CCT electricity generating procuring. • Awareness of the impact of food waste.
	Cape Town Private Sector Organics **Available:** ~83 500 tonnes per year. **Value potential:** R2.9 – R608.9 million.				S-M	
	Stellenbosch Organics **Available:** ~42 000 tonnes per year. **Value potential:** R1.5 – R305.9 million.				M-L	
	CCT WWTW Dewatered Sludge's **Available:** ~72 660 tonnes per year. **Value potential:** R1.7 – R70.2 million.				S-L	
	CCT Dewatered BBF Digestate **Available:** 27 430 – 29 200 by 2024/25, additional 27 430 – 29 200 tonnes by 2034/5, and 27 430 – 29 200 tonnes beyond 2040.				M-L	

Table 1 continued...

Theme	Opportunity	Driver	Enabler	Barrier / Risks	Term	Macro Context
Plastics	**CCT Plastics** **Available:** ~154 471 tonnes per year. **Value potential:** R231.7 mill – 1.4 billion.	• Limited municipal landfill Lifespan. • Cost of operating landfill. • Perceived job potential. • Global / local plastic sentiment. • Climate change mitigation.	• NWMS plastic waste target. • Plastic packaging EPR. • Plastic bag regulations. • CCT waste sector plan. • South African Plastic Pact. • SA Initiative to End Plastic Waste. • Industry association support.	• Competition with higher quality imports. • Slow growth in end-markets. • High levels of contamination. • Unregulated labelling systems. • Virgin plastic price variability. • Accurate plastic statistics.	S-L	• NWMS focus on plastics. • Operation Phakisa focus on plastics. • Consumer awareness. • International commitments. • Transboundary movement – Basel Convention. • African Continental Free Trade Agreement. • South Africa reluctance to join UN global treaty on plastic pollution.
	Cape Town Private Plastics **Available:** ~42 870 tonnes per year. **Value potential:** R64.3 – R385.8 million.				S-L	
E-waste	**CCT Ewaste** **Available:** ~3 697 per year. **Value potential:** R4.8 – R5.9 million.	• Limited municipal landfill lifespan. • Cost of operating landfill. • Perceived job potential. • Precious metal security. • Secondary market demand.	• Lighting and electronics EPR. • National landfill ban. • NWMS focus on e-waste. • CCT waste sector plan. • Rise of electric mobility and renewable energy infrastructure.	• Lack of reliable data. • Access to feedstocks. • Licensing of recycling / recovery facilities. • Cherry-picking of high-value e-waste. • Transboundary movement reluctance.	S-L	• NWMS focus on electronics. • Operation Phakisa focus on e-waste. • International commitments / support. • Transboundary movement (Basel Convention).
	Cape Town Private Ewaste **Available:** ~1 026 per year. **Value potential:** R1.3 – R1.6 million.				S-L	

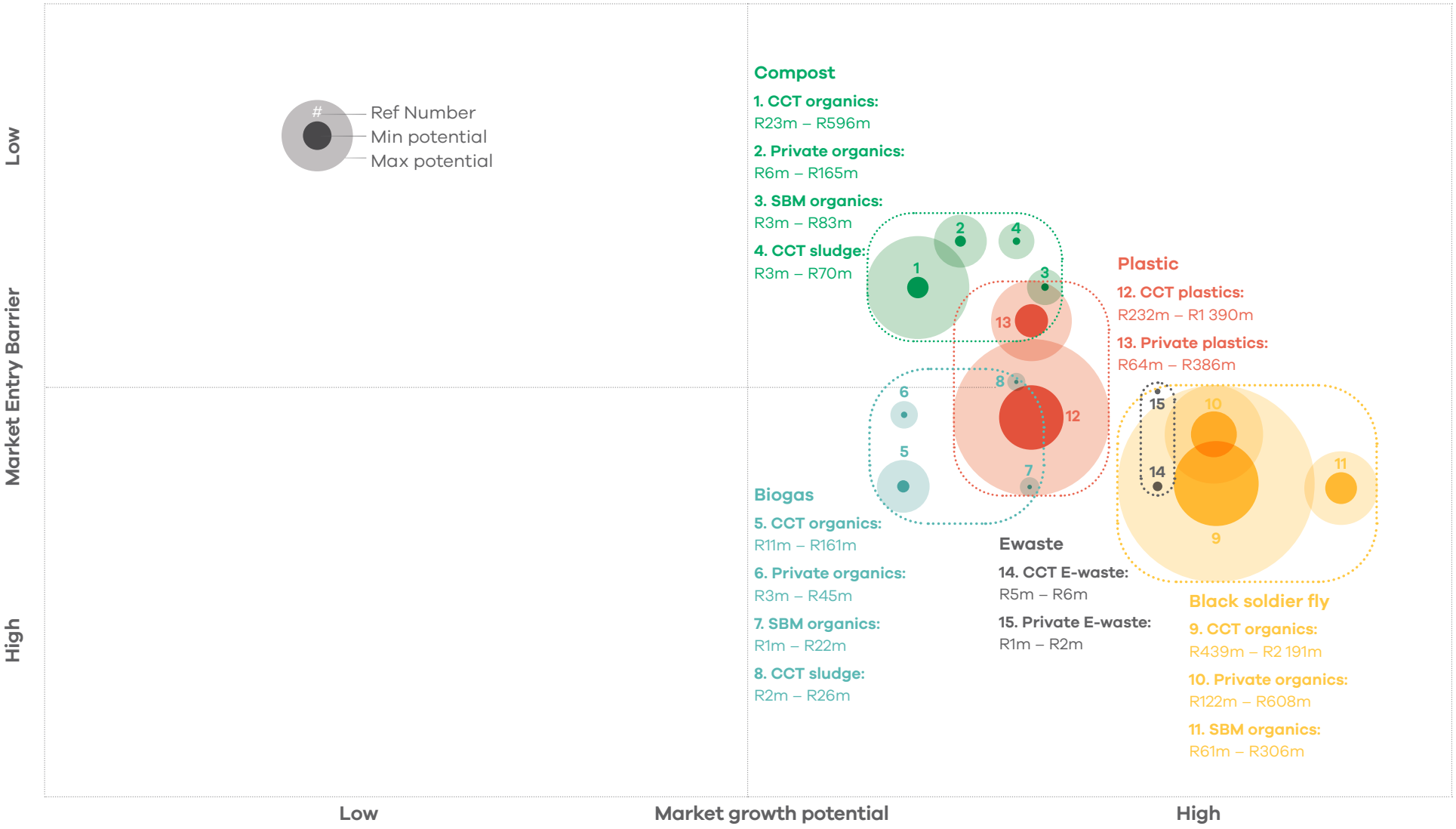

Figure 1: Opportunities prioritisation matrix

INTRODUCTION AND PURPOSE

This report provides insights into Cape Town's waste sector in particular, but also into South Africa's and the Western Cape's waste sector. The report outlines market opportunities to be considered by investors active or interested in providing waste beneficiation solutions.

One way GreenCape facilitates the growth of the green economy is through the collection, analysis, and dissemination of market intelligence. This intelligence is gathered and analysed by GreenCape's various Sector Desk Analysts. This report is a culmination of years' worth of intelligence gathering and is the backbone of GreenCape's sector desk service offering:

Section 2 provides an overview of the waste sector in South Africa (SA), with a focus on specifically Cape Town, and with some extension to the WC. 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 several strategic sectors. **Section 5** provides an overview of various finance and investment incentives.

The case for the WC as a greentech hub for Africa is covered in **Section 6**, whilst **Section 7** outlines GreenCape's role within the green economy.

Section 8 including key waste generation statistics, for the WC and the CCT, the CCT's draft Integrated Waste Management Plan's guiding deliverables, and industry associations and recycling organisation. **Section 9** lists the references used throughout the document.

For further information or queries, or to access support services offered by GreenCape, please contact GreenCape's Waste Sector Desk at +27 21 811 0250 or via email at **waste@greencape.co.za**.

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SECTOR OVERVIEW

This section provides investors and businesses with an overview of the waste sector in South Africa, and specifically Cape Town and the Western Cape. This includes how the sector is structured, key statistics, the drivers / enablers and risks / barriers to beneficiation, and industry highlights in the last year.


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2.1. Governance

National government

The national Department of Forestry, Fisheries and the Environment (DFFE) is the overarching authority for waste management in SA, and its Chemicals and Waste Management branch ensures chemicals and waste management policies and legislation are implemented and enforced in compliance with chemicals and waste management authorisations, directives and agreements.

Provincial government

Each province has a designated authority responsible for regulating waste management within its boundaries. The functions of the provincial authority include: promulgating provincial legislation; providing municipal support; and, licensing and monitoring both municipal and private sector waste activities.

The WC's Department of Environmental Affairs and Development Planning (DEA&DP) is the provincial authority for the WC, with its waste department ensuring waste management policies and legislation are implemented and enforced.

Local government

Local municipalities are constitutionally mandated to provide waste collection, removal, storage, and disposal of waste generated by households within their boundaries. This can be undertaken by the / a municipality or outsourced to the private sector. Local municipalities may also regulate how waste is managed within their boundaries through bylaws. The City of Cape Town's Solid Waste Management Department (CCT: SWMD) is the designated department responsible for managing waste within the city boundaries.

Alternative waste treatment is not explicitly required: it is considered a municipal support activity. However, the National Environmental Management Waste Act (NEMWA) and the National Waste Management Strategy (NWMS) (**Section 3.1.5**) require municipalities to support alternative waste treatment to divert waste from the landfill. Municipalities provide infrastructure for aggregation and/or separation of materials, rather than in recycling infrastructure. These facilities are operated by the municipality or outsourced.

Industry associations

SA's recycling is well supported by industry-funded associations (see **Appendix D**). These associations can focus on specific materials, a particular industry, or subsect of an industry. Each of the associations provides varying levels of support to members. Some associations also operate as a Producer Responsibility Organisations (PRO).

Producer responsibility organisations

PROs are non-profit companies that have been established either by producers or any person to support the implementation of a relevant extended producer responsibility (EPR) scheme[1]. These PROs ensure that waste materials are diverted from landfill (supply) and to ensure end market development (demand). In the past, producers in specific sectors were not mandated to practise EPR. However, as of November 2021, producers within the paper, packaging and some single-use products, the lighting, and the electrical and electronics sector will be required to register and adhere to the requirements of an EPR scheme (see **Section 3.2**).

[1] A list of PROs can be found at http://sawic.environment.gov.za/epr/search.php

2.2. South Africa's waste sector

SA's 2018 State of Waste Report (SoWR) was launched in 2019 (DEA, 2018). This report provides a snapshot of the state of South Africa's waste management in 2017 and includes an update to the 2011 national waste baseline.

According to this update, SA generated an estimated 108 Mt of waste in 2017, with an additional 299 788 tonnes imported and 748 626 tonnes exported. As such, in 2017, SA managed a total of 107.7 Mt of waste.

SA generated ~55.6 Mt of general waste, and ~52.1 Mt of hazardous waste. If the ~50 MT (46% of total waste) of ash waste is excluded from the total, SA generated ~57.7 Mt of non-ash waste. Figure 2 illustrates the split between general and hazardous waste generated in SA and a couple of noteworthy streams.

Despite extensive and progressive regulations, SA recovered ~20.4 Mt of waste for recycling, resulting in an input[2] recycling rate of only 19%. If ash and recycled material are excluded, South Africa recovered a more favourable 34% (19.5 Mt) of non-ash waste for recycling (DEA, 2018). Figure 3 provides a comparative depiction of the input recycling rate for total waste generated and non-ash waste generated in South Africa.

A note of caution: The main challenge noted when developing SA's SoWR was the lack of waste data. Whilst there are established mechanisms for collecting waste data, they are not fully utilised and/or enforced. Few municipalities have functional weighbridges to collect accurate disposal data for landfills, or capacity to accurately record and report the data. Despite these challenges, DFFE is confident in these estimates to inform high-level policy decisions, which in turn informs the NWMS.

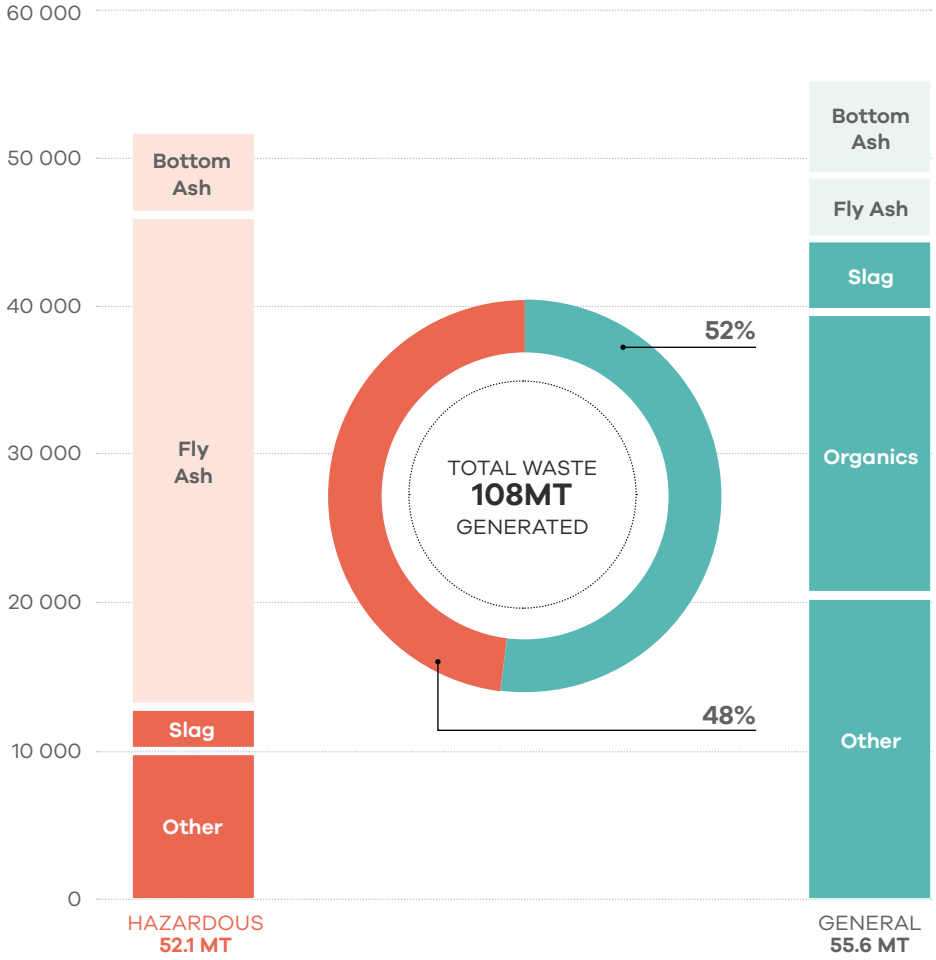


Figure 2: Total waste generated in South Africa in 2017 by classification

Source: Modified from South Africa State of Waste Report 2018 (DEA, 2018)

[2] The input recycling rate is the material entering a recycling facility, and excludes what is actually recycled.

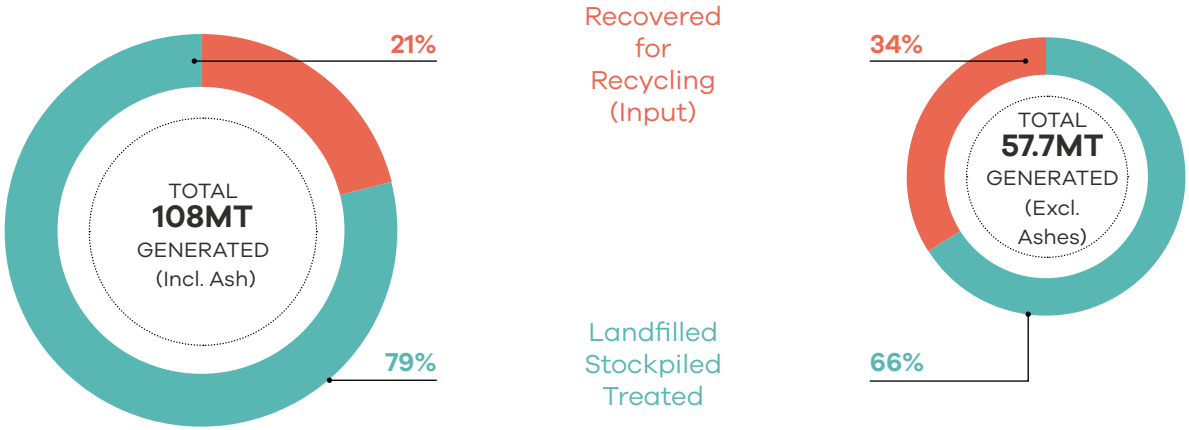


Figure 3: Input recycling rate for total waste generated for South Africa in 2017

Source: Modified from South Africa State of Waste Report 2018

2.2.1. National Waste Management Strategy (2020)

SA's overarching waste management framework, the NEMWA (Section 3.1.2), is given effect through the NWMS. This strategy outlines national government's strategic approach to waste management for SA and includes actions to reach a set of ambitious goals. Section 8 of the NWMS (2020) provides targets and timelines that affect both the private sector and municipalities.

The NWMS should provide investors and businesses with broad insights into landfill diversion opportunities at national, provincial and local level. Table 2 lists the various interventions and actions to meet a set of targets:

- **Target 1:** 40% of waste diverted from landfill within 5 years; 55% within 10 years; and at least 70% within 15 years, Zero-Waste to landfill beyond 2035.
- **Target 2:** All South Africans live in clean communities with waste services that are well managed and financially sustainable.
- **Target 3:** Mainstreaming of waste awareness and a culture of compliance resulting in zero tolerance of pollution, litter and illegal dumping.

2.2.2. Waste Economy Master Plan

The DFFE is developing SA's waste economy master plan. The master plan is a strategic planning guide on how the DFFE will practically manage waste within its jurisdiction, and is informed by several key instruments, including: the Sustainable Development Goals (SDG), the National Development Plan (NDP), the NWMS, and also the Chemicals and Waste Economy Phakisa (Section 2.2.3) action plans and business cases. This master plan should be finalised in 2022.

Table 2: Key interventions and actions to meet the NWMS targets

Source: DEFF (2020)

Key intervention		Actions	
Pillar 1: Waste minimisation		**40% of waste diverted from landfill within 5 years; 55% within 10 years; and at least 70% within 15 years, leading to zero-to-waste going to landfill.**	
1	Prevent waste generation through cleaner production, industrial symbiosis and EPR	1	Develop and implement EPR schemes for priority wastes (i.e. WEEE, Paper and Packaging, Lighting, and Tyres) that include measures for cleaner production, industrial symbiosis, and extended producer responsibility.
		2	Strengthen the capacity and national reach of the NCPC-SA through establishing waste symbiosis programmes in all provinces.
		3	Minimise the production and retail of single-use plastics for consumption within the country and replace the products with bio-degradable alternatives.
		4	Standardise design and packaging of sustainable products that reduce production of waste, maximise resource recovery for recycling or reuse, and support consumption of materials and products with a prolonged life.
2	Prevent food waste	5	Develop and implement a strategy for reducing food losses and waste prior to retail, and that is associated with harvesting, processing, and transport of food with food producers and retailers.
		6	Improve consumer awareness and standards for labelling and marketing of perishable foodstuffs and "ugly" fruit and vegetables.
		7	Develop guidelines, norms and standards for redistributing surplus foods and composting of spoilt foods.
3	Increase re-use, recycling and recovery rates	8	Develop and implement a public procurement framework to support recycling, encompassing requirements for recycled content.
		9	Establish MRFs and recyclate processing plants as public private partnerships based on regionally integrated waste management planning.
		10	Develop and implement industry standards that align technology requirements between primary producers and recyclers of all materials, by ensuring that the design and packaging of products maximise the value of the materials that circulate within the economy.
4	Divert organic waste from landfill through composting and the recovery of energy	11	Develop and implement an enabling environment to produce biogas through anaerobic bio-digestion of organic waste, treating sewage and organic domestic waste.
		12	Develop and implement biogas digester projects linked to the National School Nutrition Programme.
		13	Include and implement organic waste technologies in local government Integrated Waste Management's (IWMPs).

Table 2 continued...

Keyintervention		Actions	
5	Divert construction and demolition waste from landfill through beneficiation	14	Develop and implement best practice guidelines and standards for the re-use of Construction and Demolition (C&D) waste in roads and other building materials, e.g. bricks.
6	Increase technical capacity and innovation for the beneficiation of waste	15	Promote research and innovation in the waste sector.
		16	Review and update or develop new legislation / instruments to keep abreast of technical developments and remove unnecessary regulatory barriers to the uptake of new technologies.
		17	Increase technical capacity and skills in the waste sector.
Pillar 2: Effective and sustainable waste services		**All South Africans live in clean communities with waste services that are well managed and financially sustainable**	
7	Separate Waste at Source	18	Integration of waste pickers into municipal collection services.
		19	Public online and annually update guidelines, case studies and planning tools on separation at source for municipal managers.
		20	National awareness campaign on recycling and waste management.
8	Safe and environmentally sustainable disposal of hazardous household wastes	21	Develop and implement a strategy for the safe disposal of household hazardous waste that includes a communication and awareness plan and EPR as core components.
		22	Develop and implement a strategy and standards relating to the design and disposal of AHPs such as baby and adult diapers, feminine care products.
9	Effective integrated waste management planning	23	Development and implementation of 5-year provincial and municipal integrated waste management plans.
		24	Improve collection, reporting and dissemination of information on South African Waste Information System (SAWIS).
		25	Build capacity in integrated waste management planning and provide revised IWMPs guidelines.
		26	Municipalities include provisions for recycling drop-off / buy back / storage centres in their IWMPs, supported by fiscal mechanisms / EPR schemes.

Table 2 continued...

Pillar 3: Compliance, enforcement & awareness		Mainstreaming of waste awareness and a culture of compliance resulting in zero tolerance of pollution, litter and illegal dumping	
10	Reduce Pollution, littering and illegal dumping	27	Develop and implement a national awareness campaign about litter and illegal dumping.
		28	Establish a micro-grant facility training and purchasing of equipment for community-based clean-up operations.
11	Enhance capacity to monitor compliance and enforce the Waste Act and International Agreements	29	Agreement between DFFE, SAPS and NPA on increasing enforcement of Waste Act and municipal bylaws relating to pollution, littering and illegal dumping.
		30	Increase the number of Environmental Management Inspectors dedicated to monitor compliance and enforce of the Waste Act.
		31	Proclamation on import and export of waste.
12	Ensure municipal landfill sites and waste management facilities comply with licensing requirements	32	Develop financial mechanisms to enforce compliance to licence conditions.

2.2.3. Chemical and Waste Economy Phakisa

The Chemical and Waste Economy Phakisa is a waste-related Operation Phakisa[3] that brings together various stakeholders from the public and private sector to boost economic growth and create jobs.

Since 2017, and after several updates, a set of 20 initiatives have been identified. Each initiative is accompanied by an action plan and business case. At the time of drafting this MIR, the DFFE had appointed consultants to review and update the existing action plans and business cases, and to develop a capital raising strategy to solicit required funding from both public and private funders.

This key collaboration will be used to inform the development of the DFFE's Waste Economy Master Plan. As such, it provides investors and businesses with insights into where waste management is heading in SA, and what landfill diversion opportunities may arise. **Table 3** summarizes the 20 initiatives.

More information on the initiative and outcomes of the update should also be uploaded to a designated website[4].

[3] Operation Phakisa is a national government led mechanism used to fast track the implementation of solutions on critical development issues under the National Development Plan.

[4] www.operationphakisa.gov.za/operations/Chemical/Pages/default.aspx

Table 3: Summary of the 20 Chemical and Waste Phakisa initiatives

Source: Participation in Phakisa validation workshop (2021)

Theme	Initiative	
Bulk industrial waste	1	Ash for Bricks
	2a	Soil Amelioration
	2b	Acid mine drainage for Backfilling
	3	Ash for Export
	4	Sewage Sludge
	5	Meat Waste
Municipal waste	6	E-Waste Levy
	7	Government E-Waste Stockpiles
	8	Separation-at-Source
	9	Material Recovery Facility
		Pelletization Facility
	10	Construction and Demolition waste Recycling
Product design and waste minimisation	11 & 12	Agri-Platform
	13	Packaging Guidelines
	14	Packaging EPR
	15	Refuse Derived Fuel
Chemical waste	16	Refrigerant Recycling
	17	Lead-free paint
	18a	Asbestos
	18b	Mercury
Crosscutting	19	SMME Creation
	20	Awareness Raising

2.3. Cape Town's waste sector

2.3.1. Waste generated

The most recent waste statistics for the WC indicate that the province generated ~7.7 Mt of waste in 2015 (DEDAT, 2016). The waste profile is largely made up of municipal solid waste (MSW), and agricultural waste and/or residues. This is to be expected, as much of the WC's economy is driven by agriculture value chains, and tertiary services.

Table 4 illustrates the tonnages of waste generated in the Western Cape by a broad source in 2015. Appendix A provides a detailed waste profile for district municipalities and the CCT metropolitan municipality for 2015.

However, the WC is not a homogeneous province, but rather a collection of municipalities of various population sizes and economic activities, and subsequently exhibits varying waste profiles. Figure 4 illustrates this phenomenon.

The CCT metropolitan area is the economic hub of the WC, contributing ~72% of the provincial Gross Domestic Product (GDP), supporting ~66% of the population, and is characterised as highly urbanised (CCT, 2021c). Figure 5 illustrates the metropolitan area's typically urban-like waste profile for 2015.

Table 4: Total waste tonnages generated per district municipality / metro in 2015

Source: DEDAT, 2016

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

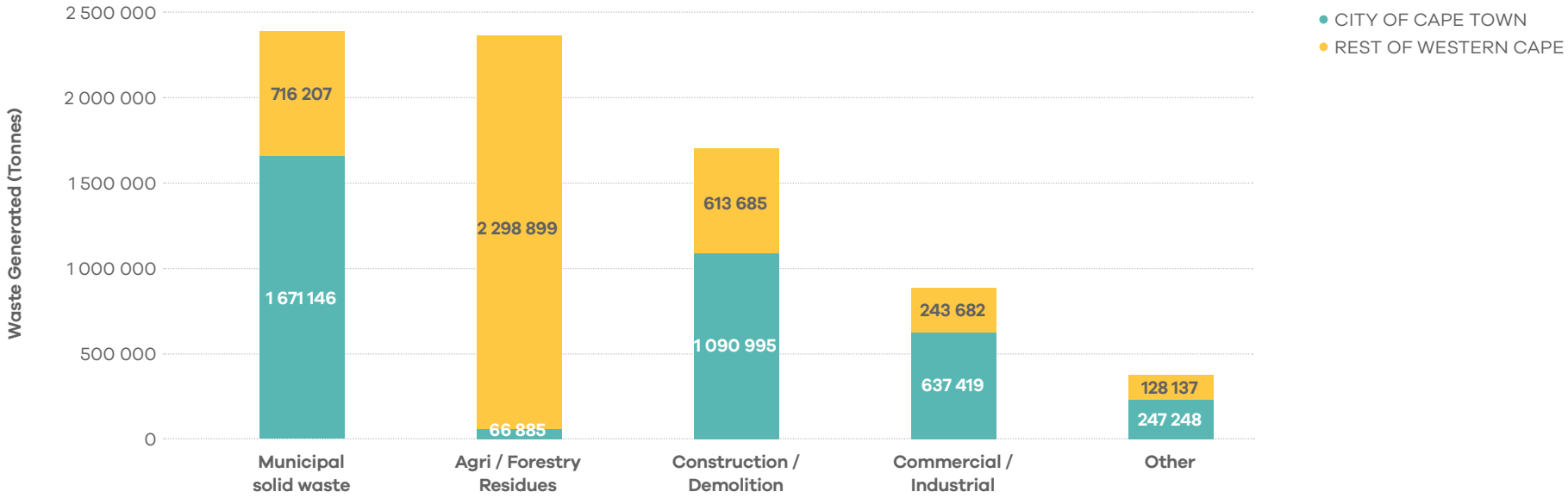


Figure 4: Waste generated in the CCT and surrounding municipalities for 2015

Source: (DEDAT, 2016)

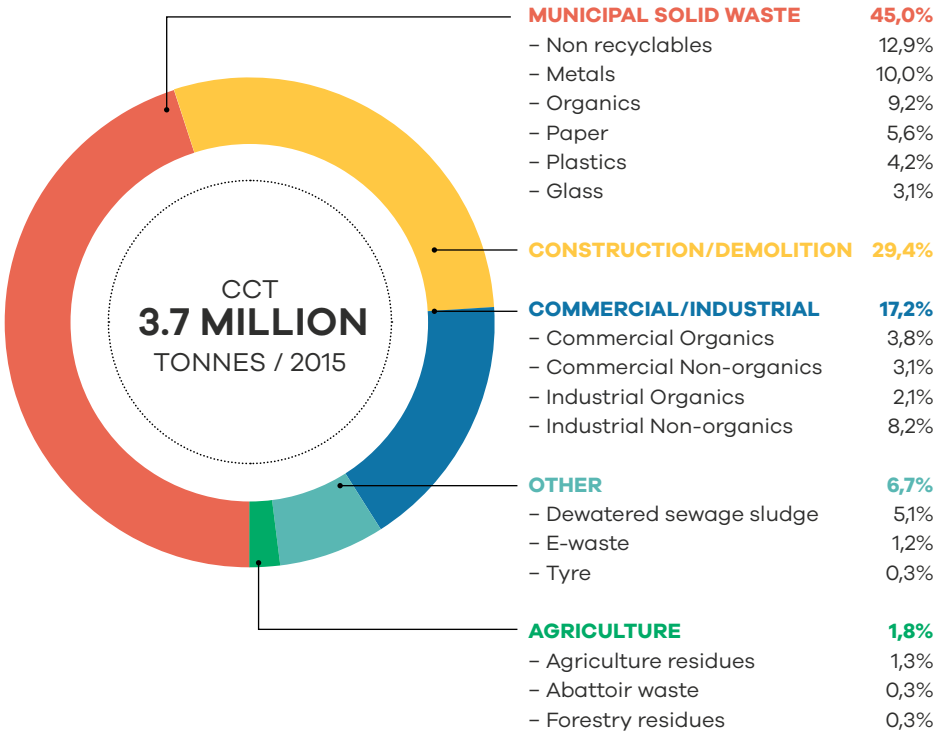


Figure 5: The City of Cape Town waste generated characterisation in 2015

Source: DEDAT (2016)

2.3.2. Waste landfilled

It is difficult to determine accurately how much waste is generated within a municipal boundary. It is, however, possible to determine how much waste passes over a landfill weigh bridge and subsequently disposed of at that landfill. Cape Town has three well-managed sanitary landfills, accepting and recording waste. Coastal Park and Vissershok (municipal) landfill are CCT owned assets, whilst Vissershok Holdings WMF (private) is equally owned by two prominent waste companies, namely Averda and Enviroserv.

The CCT has a well-functioning data collection and reporting protocol whereby up-to-date municipal waste data is uploaded to the CCT's **Online Data Portal**[5], whilst the private landfill figures must be reported monthly to the CCT, as per the Integrated Waste Management Bylaw.

Figure 6 illustrates the waste landfilled at both CCT owned landfills, and an estimate of waste landfilled at Vissershok private landfill for 2020 only. The CCT receives almost double the amount of waste that the private landfill receives.

In total, ~1.68 million tonnes of waste were landfilled in Cape Town in 2020. Of this, 1.08 (64%) was landfilled at municipal landfills, and the remaining ~600 000 (36%) was landfilled at Cape Town's only private landfill.

The most recent waste characterisation study for the CCT's MSW was undertaken in 2018, and focused on waste destined for landfill. The study looked at waste that was aggregated at six municipal aggregation facilities. **Figure 7** illustrates the broad profile of this MSW, whilst **Appendix B** provides a detailed breakdown.

[5] CCT waste data can be found online at web1.capetown.gov.za/web1/opendataportal/Default

This illustration essentially indicates what MSW materials are still being sent to landfill, and are potentially available for recovery and beneficiation. Businesses looking to establish or expand their material recovery services should consider using this characterisation study as a guide to what is potentially available.

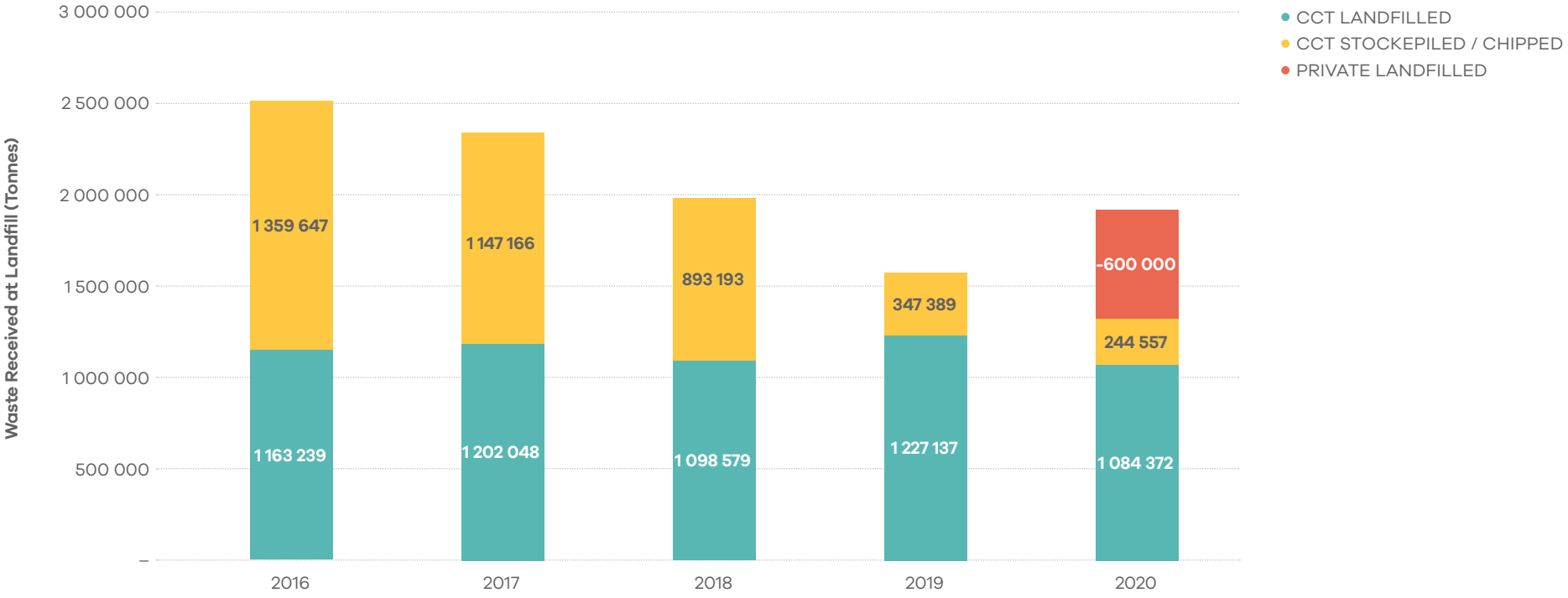


Figure 6: Waste landfilled / stockpiled at Cape Town landfills between 2016 and 2020

Source: CCT online data portal and engagements with private sector

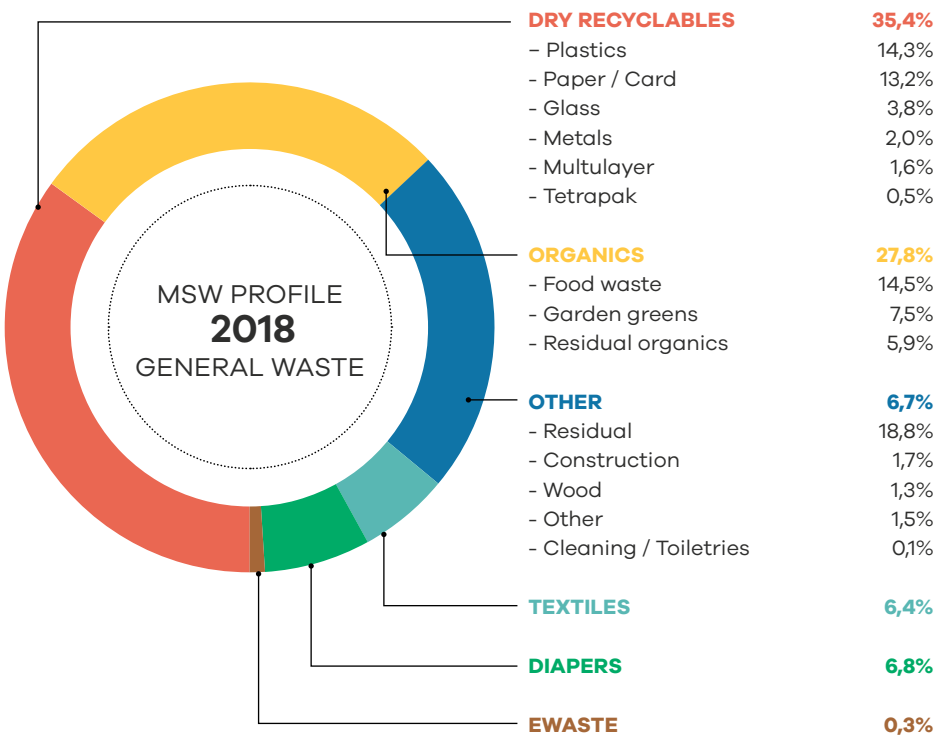


Figure 7: Broad waste characterisation study undertaken on CCT's MSW in 2018

Source: Adjusted from (CCT, 2018)

2.3.3. City waste minimisation

In addition to private sector activities diverting waste from landfill, the CCT also has its own waste minimisation programmes that seek to recover broad garden greens, dry recyclables, and builder's rubble for beneficiation. Figure 8 illustrates the breakdown of the materials recovered from specifically CCT programmes and excludes private sector initiatives.

Delivery of many of the CCT programmes are outsourced to the private sector but these are recorded as CCT diversion. The CCT is expected to substantially expand its material recovery programmes and infrastructure in the coming years. Appendix B also provides a detailed breakdown of material going to landfill that could be recovered.

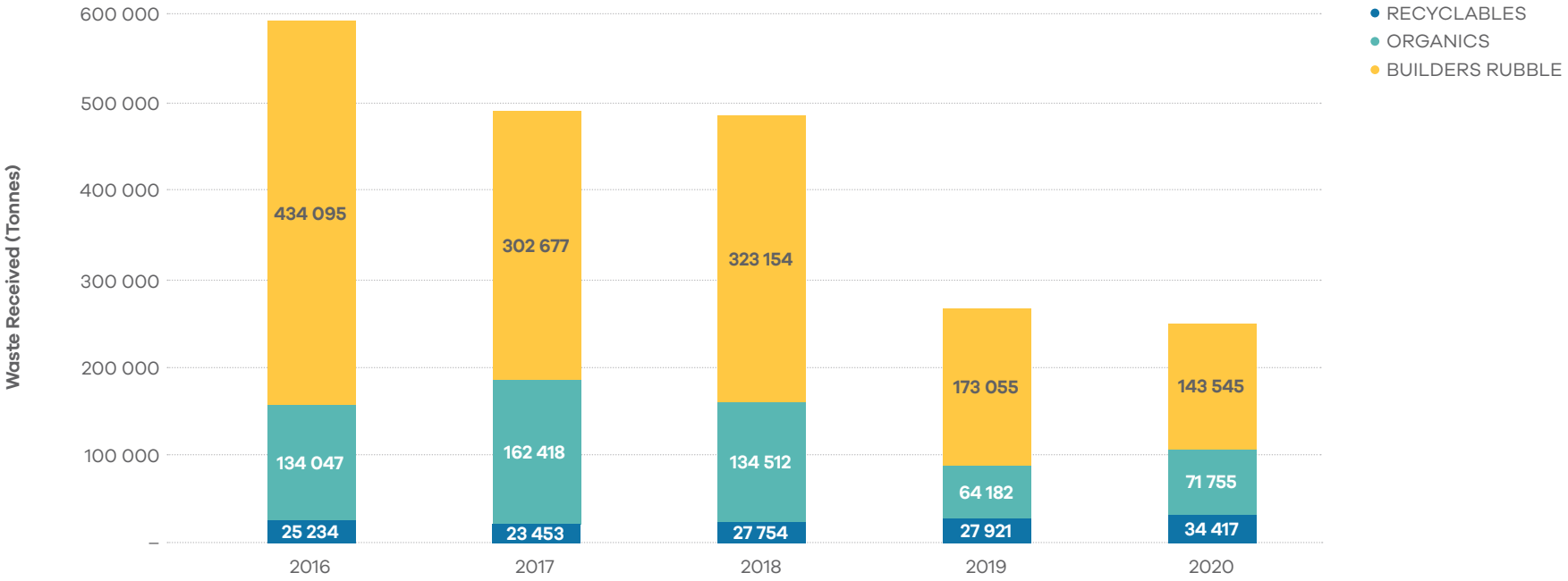


Figure 8: Waste recovered by CCT minimisation programme between 2016 and 2020

Source: CCT online data portal

2.3.4. Landfill Disposal Costs

The CCT funds solid waste management services in three ways: two are tariff funded and one is by property rates. The tariff funded services consist of a disposal tariff and a refuse collection tariff.

It is the cost of these tariffed disposal services that landfill alternative solutions need to compete with.

Disposal: Disposal of waste to landfill continues to be the prominent disposal option in SA.

Direct landfill disposal incurs a cost, also known as a gate fee, that is charged per tonne. Such gate fees are relatively low in SA compared to more progressive economies. Despite this, waste generators still regard landfilling waste as a costly overhead.

Figure 9 illustrates the municipal landfill gate fees for general waste across SA's eight metropolitan areas.

The CCT has the highest metropolitan landfill gate fee in the country for general waste per at R557 (excl. 15% VAT) per tonnes. Figure 10 illustrates the rising cost of landfilling waste at the CCT's municipal landfills from 2014/15.

This is expected to increase above inflation for the coming years with an increase of ~8.9% for the next two years[6].

The CCT has the highest metro landfill gate fee in South Africa, which is expected to rise above inflation in the coming years. This should motivate waste generators and waste service providers to seek cheaper alternatives to landfilling.

As the cost of landfill disposal increases, so do overheads for waste generators. This should strengthen the business case for businesses looking to invest in providing landfill alternatives to Cape Town's businesses. This makes Cape Town an attractive location for waste beneficiation solutions that rely on gate fees as a source of income.

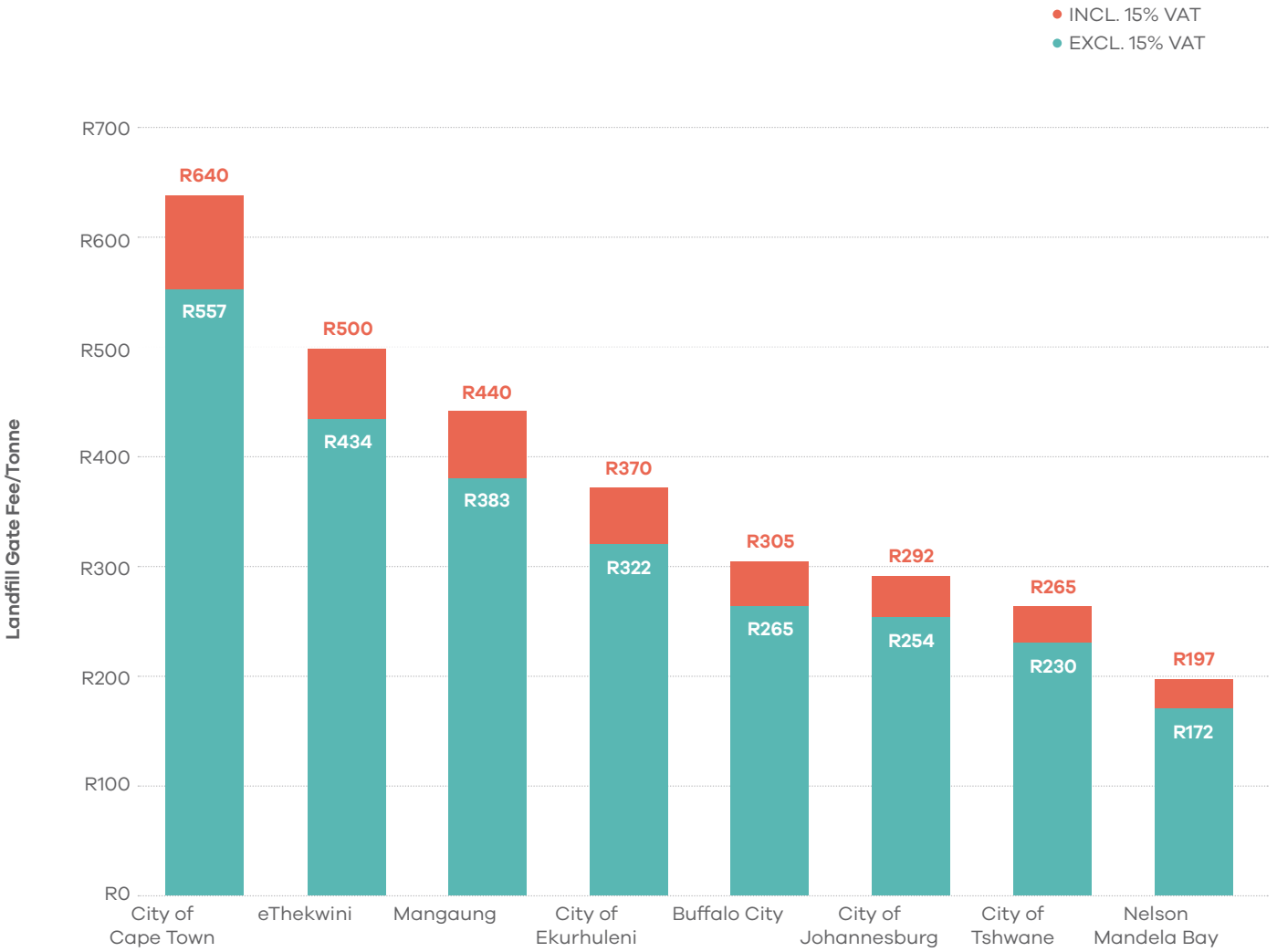


Figure 9: Landfill gate fees for general waste at South Africa's eight metros for 2021/22

Source: Respective metropolitan tariff books for 2021/22

[6] As indicated in CCT (2021a)

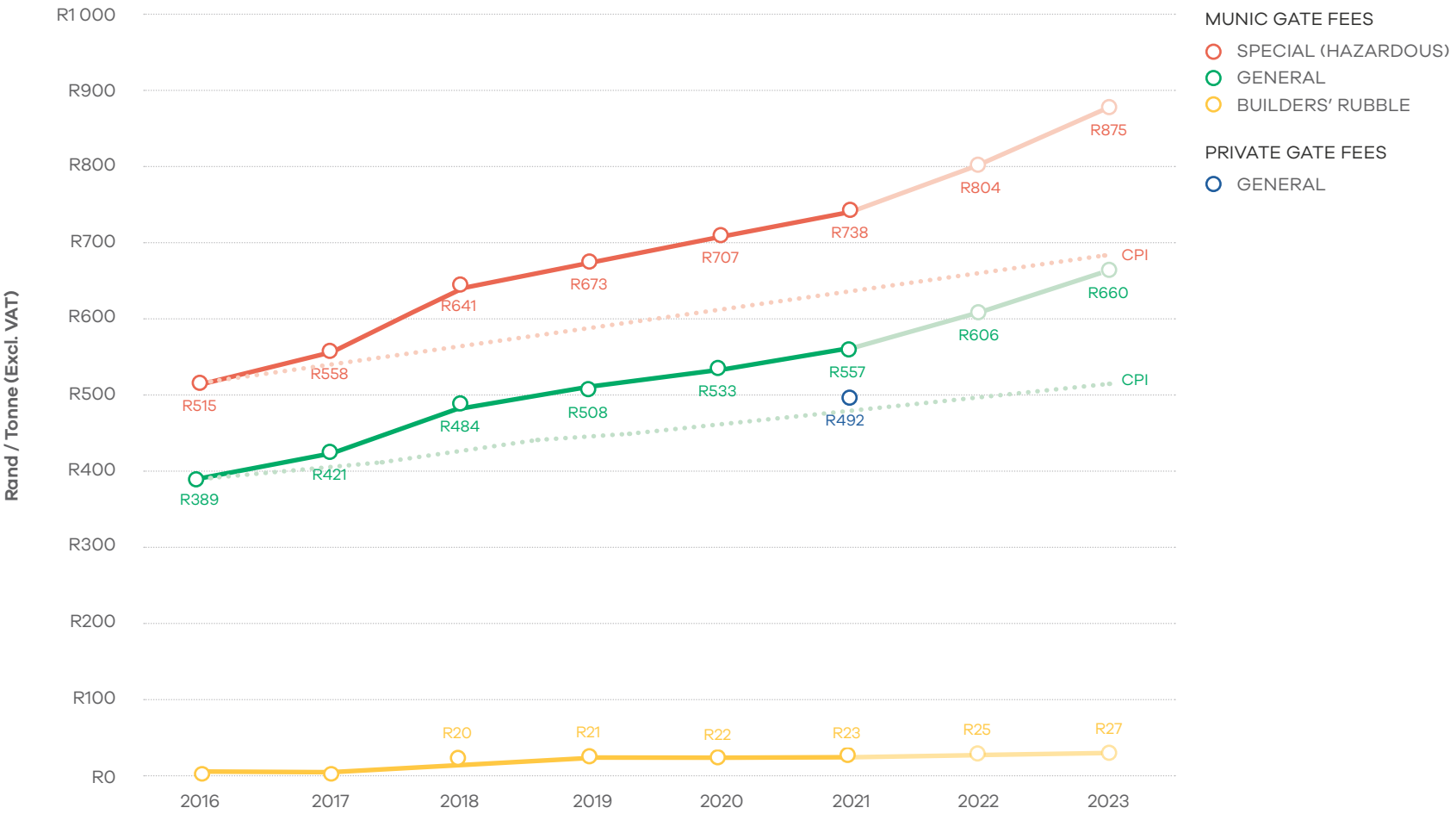


Figure 10: Cape Town municipal and private landfill gate fees since 2016

Source: GreenCape and CCT (2021a)

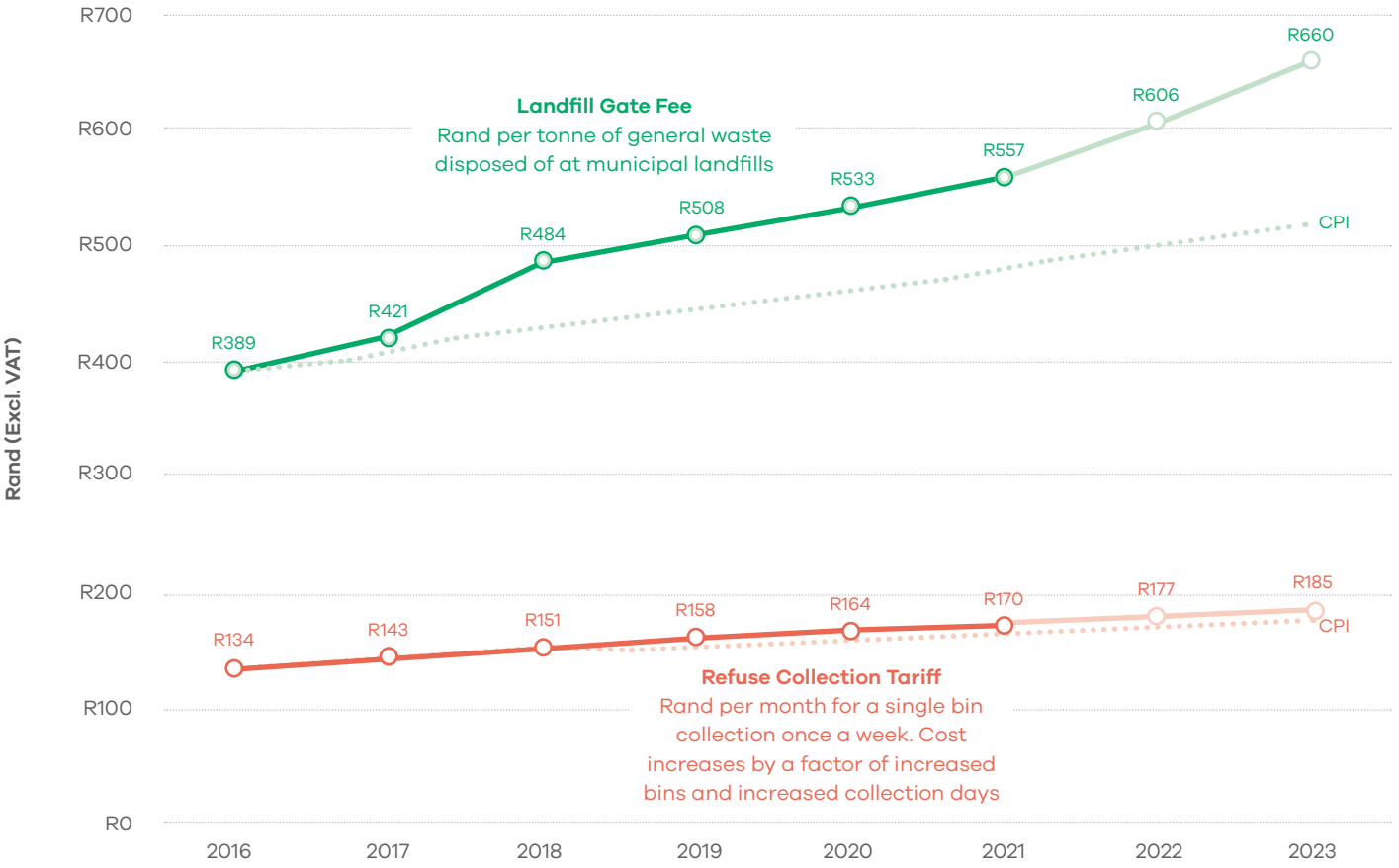


Figure 11: CCT refuse collection tariffs and landfill gate fee for general waste

Source: GreenCape and CCT (2021a)

Refuse Bins: The CCT also provides most of its formal constituents with refuse bin collection services. This includes both households, and also complexes, and businesses, however this is not mandatory and is at the discretion of the CCT. This comes at a cost. Cape Town employs a partial pay-as-you-throw (PAYT) approach, but not in the true sense. Instead of charging generators based on weight, the CCT charges per number of refuse bins collected. This is set as a tariff amount per bin per frequency collected (Figure 11).

As households must pay this amount irrespective of whether they are outsourcing landfill alternatives, there is no incentive to reduce waste for disposal. However, housing complexes and apartment buildings may request a reduced number of bins to be collected and subsequently charged to the body corporate[7]. This means the body corporates can shift the savings to landfill alternative services.

[7] Housing complexes are limited to reducing the number of bins serviced to one third the number of units.

As for businesses, they can also shift savings to landfill alternatives.

It should be noted that although the cost of landfilling in the Cape Town metropolitan area is expected to increase by 8.94% in 2022/23 and 8.91% in 2023/24, the cost of refuse collection is expected to increase by an average of only 4.5% over the same period[8]. As could be interpreted from **Figure 11**, there is a growing reliance on landfill disposal fees to raise revenue compared to households. This puts more pressure on businesses to divert waste, but not households.

2.3.5. Landfill airspace

The WC, like many other regions of SA, is grappling with the availability of landfill airspace (i.e., capacity) to accommodate disposal. Old landfills are closing, operational costs of existing landfills increase annually above inflation, and the sighting of new landfills is challenging. Some municipalities are in a more precarious situation than others, as depicted in **Figure 12**.

The Cape Town metropolitan area hosts three operational landfills:

Municipal Landfills: Vissershok municipal landfill is a Class A landfill, and is designed to accept general and hazardous waste. Coastal Park landfill is a Class B landfill, and accepts only general waste.

Coastal Park Landfill has limited airspace and is projected to reach capacity within five years, and by implication, all waste will be disposed at Vissershok municipal landfill in the future. The CCT expects to run out of total landfill capacity by 2032. The CCT is seeking to develop a regional landfill to secure long-term disposal capacity.

However, this is an ongoing process with many delays and is unknown when this landfill will be sited.

Private Landfills: The Vissershok private landfill is the third operating landfill within the Cape Town metropolitan. The Class A landfill is located next to the Vissershok municipal landfill. This private landfill is owned equally by two large waste companies: Enviroserv and Averda.

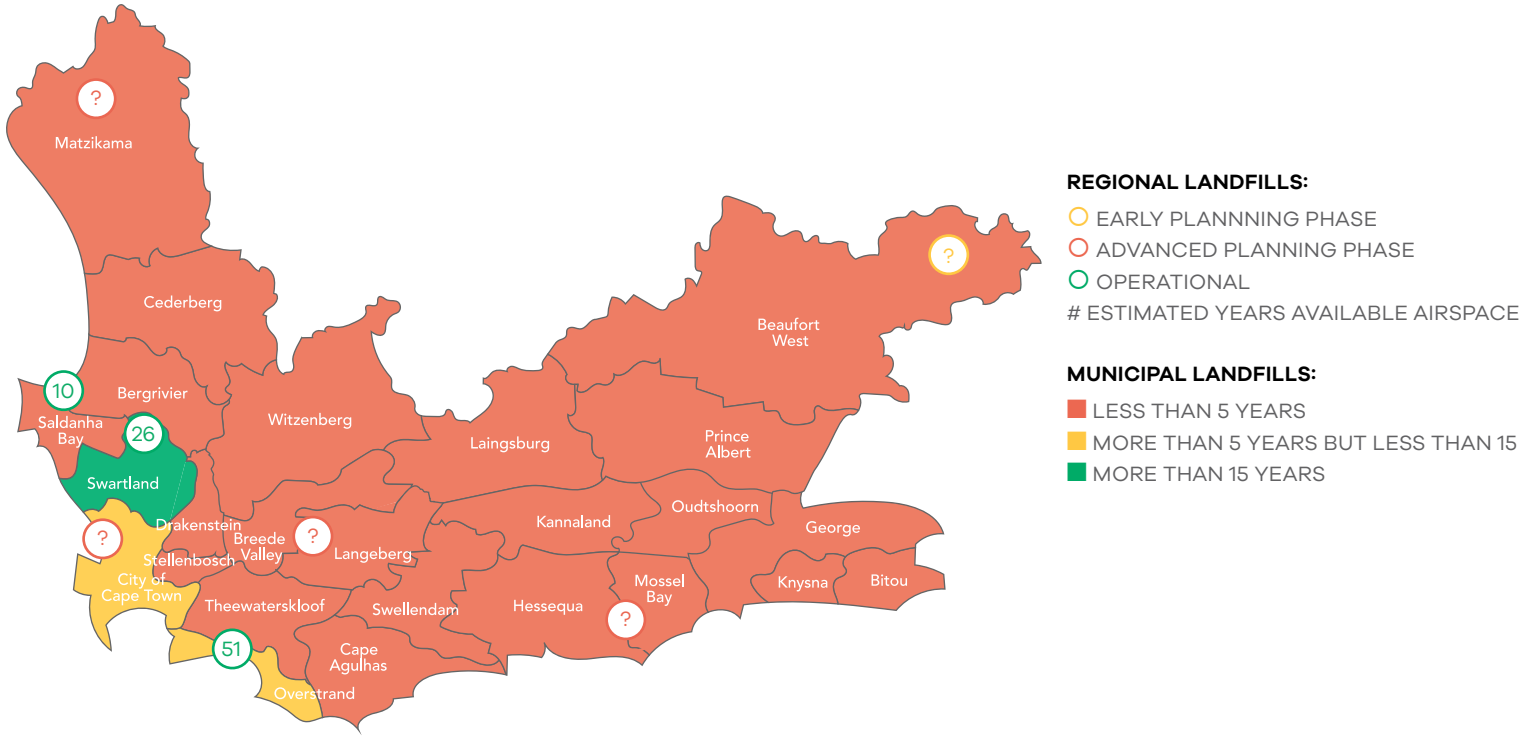


Figure 12: Estimated landfill lifespan for each local municipality in the Western Cape

Source: DEA&DP engagements

[8] As indicated in CCT (2021a).

Although it is likely that the CCT can handle current and future waste disposal, the lack of airspace in neighbouring municipalities, notably Stellenbosch and Drakenstein local municipalities, will likely result in the cross-border movement of waste between municipalities. Thus, Cape Town landfills will likely serve as quasi-regional landfills. This would in effect increase airspace consumption and reduce landfill lifespans. It will provide further impetus to support landfill diversion by the CCT, its neighbours and private sector.

2.3.6. The City of Cape Town Waste Sector Plan (2022) (DRAFT)

The CCT's Solid Waste Department is in the process of drafting its Waste Sector Plan[9]. This internal plan will act as a guiding document on how the CCT will practically manage waste within its jurisdiction for the next 20 years.

This Waste Sector Plan will be used as the CCT's **Integrated Waste Management Plan** (IWMP) which will be used to inform the 2022-2027 Intergrated Development Plan (IDP). Where the Waste Sector Plan covers a 20-year time horizon, the IWMP covers a five-year time horizon. At the time of writing this MIR, the draft plan had gone through the public participation process and should be finalised and adopted by July 2022. As such, discussed below are not finalised and could change in the meantime.

Diversion Targets: The finalised plan needs to align with key strategic plans such as the CCT's Integrated Development Plan (2022-2027)[10] and the CCT's Climate Change Strategy which was approved in May 2021. But more importantly, the plan also draws from the targets set in the NWMS and the provincial organic waste strategy and subsequent provincial IWMP. All of which are discussed in **Section 3**.

The draft plan sets several noteworthy diversion targets:

- 40% landfill diversion 2025
- 55% landfill diversion by 2030
- >70% landfilled diversion by 2035
- 85% landfill diversion by 2050[11]
- 50% organic waste diversion by 2022
- 100% organic waste diversion by 2027

Strategic Deliverables:
The CCT has identified 23 strategic deliverables that need to occur in order to meet its vision and strategic intents as outlined in the draft plan. These strategic deliverables are listed in **Appendix C**.

Of importance to material extraction and waste beneficiation are the CCT plans for the:

- Development of infrastructure.
- Regulatory amendments.
- Leveraging existing facilities to divert organics and packaging waste.
- Separation at source for organics and recyclables.
- Pay-as-you throw (PAYT) funding options.
- Fortnightly recyclables collection.
- Development of material recovery facilities (MRF) to process separated material.

Project Pipeline: Section 4 of the draft plan provides a 20-year pipeline of key projects to meet the above strategic deliverables, including several large infrastructure projects for material recovery of both dry recyclables and organic waste.

[9] The draft Waste Sector Plan, can be found on the City of Cape Town website www.capetown.gov.za/City-Connect/Have-your-say/Issues-open-for-public-comment/draft-2022-2027-water-and-waste-sector-plans

[10] The CCT was in the process of developing its IDP for adoption in early 2022.

[11] An additional target in the CCT Climate Change Action Plan

The commitments made in the draft Waste Sector Plan, and if finalised, will no doubt unlock service provision opportunities for the private sector, but also result in ensuring long-term supply of both organic waste and dry recyclables to the recycling sector as a whole. This should bode well for investors / businesses concerned with security of material supply.

This material recovery supports the various other private and public sector waste initiatives focusing on growing the demand side of material beneficiation.

2.3.7. Municipal Spend

Municipalities must annually adopt and adjust their budgets for revenue and operational expenditure, capital expenditure, and cash flow to meet the goals of the Gross Domestic Product (IDP)[12]. These budgets are a great source of insight to understand where municipalities are focusing their attention and provide an indication of future projects. **Figure 13**, **Figure 14** and **Figure 15** illustrate the planned revenue, operational expenditure and capital expenditure respectively for the CCT from 2016/17 to 2023/24 (anticipated).

For 2021/22, the CCT expected to raise a total of R50.83 billion in revenue, of which R1.84 billion (3.6%) is expected to be sourced from waste related services (tariffs and landfill gate fees). In the same year, the CCT plans on spending a total of R48.32 billion to operate and provide services. Of this, R2.51 billion (5.19%) is planned for providing waste services. Lastly, of the total R8.83 billion planned for capital expenditure (assets), R0.55 billion (6.3%) of this will go to waste related assets such as infrastructure.

To provide its constituents with waste management services that align with diversion targets, the CCT seeks to make several large infrastructure investments. Although the CCT is seeking to strengthen its waste service provision through investing in the extension of landfill disposal capacity, it is also ramping up material recovery investments in strategic infrastructure and initiatives. According to the unadjusted budget, the CCT is expected to spend R554.8 million on new solid waste related assets for 2021/22, and a total of R1.4 billion over the next three years. The above budget is likely to change with the finalisation and implementation of the CCT's expected 2022-2027 IDP, which is informed by the finalised IWMP.

[12] The CCT's 2021/22 annual budget took effect on 1 July 2021 and can be found at www.capetown.gov.za/local%20and%20communities/meet-the-city/the-city-budget

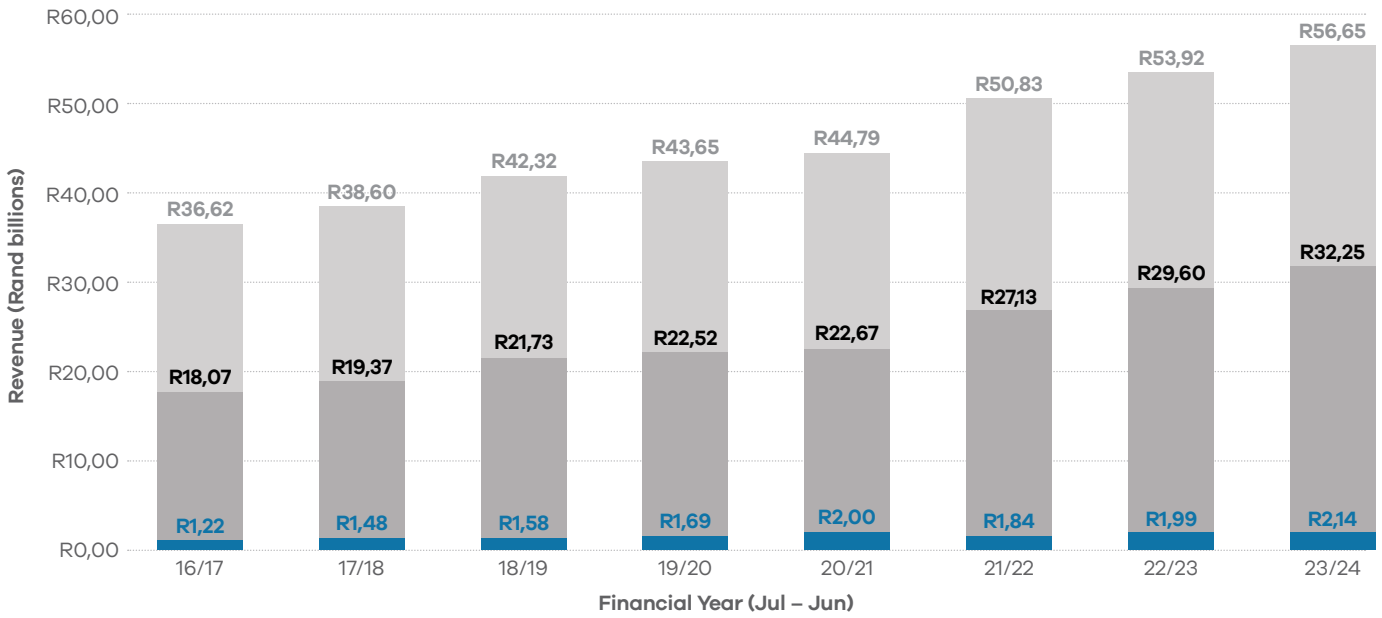


Figure 13: The CCT's revenue source from 2016/17 to 2023/24

Source: CCT (2021e)

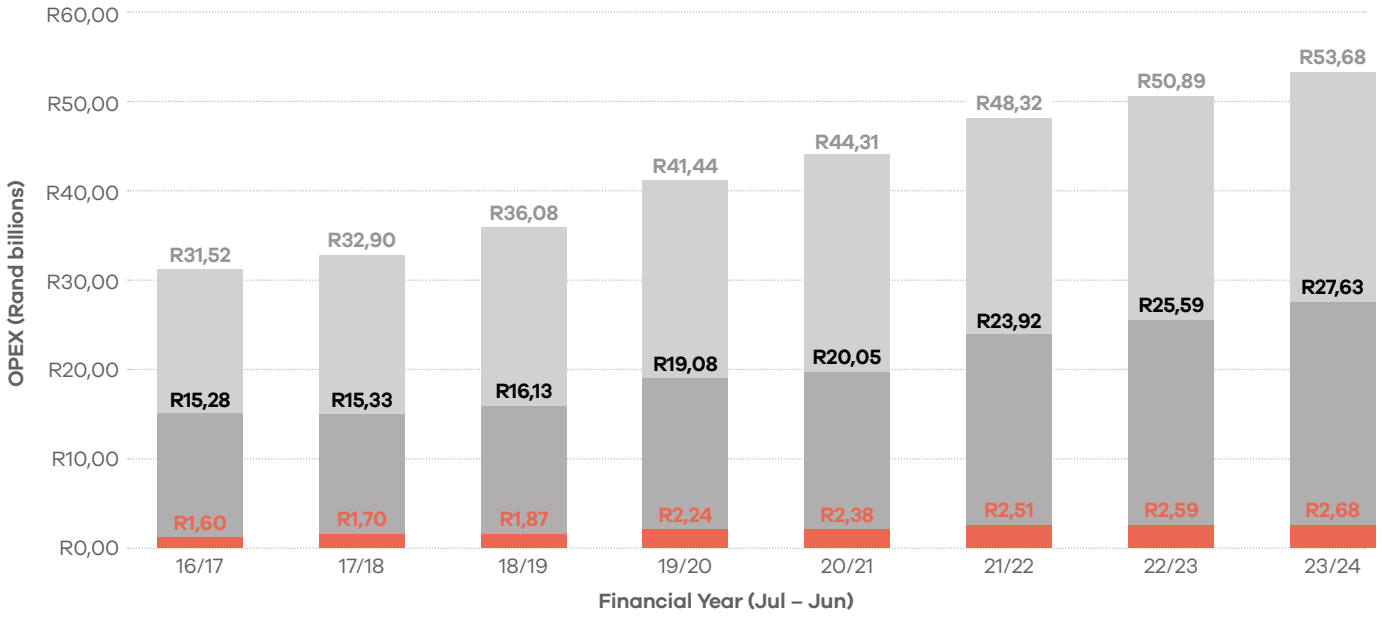


Figure 14: The CCT's OPEX spend from 2016/17 to 2023/24

Source: CCT (2021e)

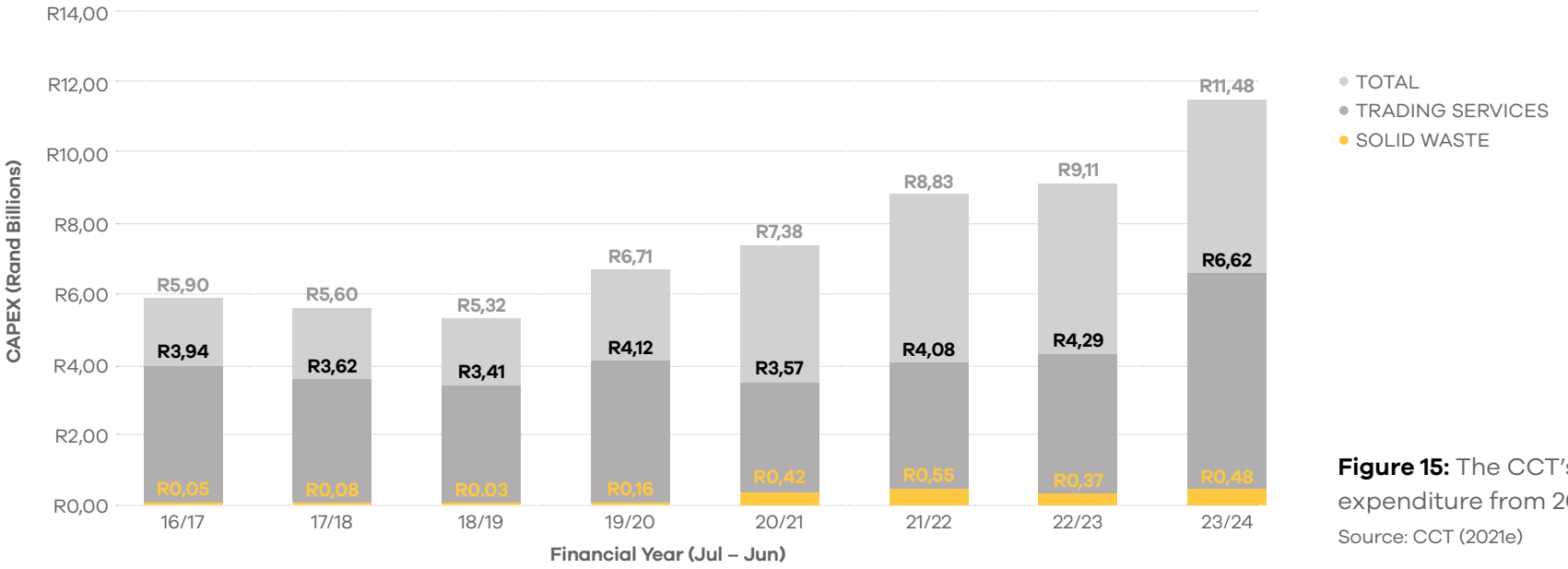


Figure 15: The CCT's CAPEX expenditure from 2016/17 to 2023/24

Source: CCT (2021e)

2.4. Industry updates

Chemicals and Waste Economy Phakisa Refined

In 2017, twenty (20) initiatives were identified during the Chemical and Waste Economy lab to meet strategic waste targets. After the initial planning and development of action plans, there was a delay before a realignment workshop was undertaken. However, with the onset of COVID-19, implementing the various action plans was again stalled.

In 2021, the DFFE appointed consultants to review the action plans and business cases, and develop a capital raising strategy to solicit required funding (see Section 2.2.3).

Manditory Extended Producer Responsibility Regulations

SA's extended producer responsibility regulations took effect on 05 November 2021 (Section 3.2).

Producers (as defined) of paper, packaging, electrical and electronic equipment and lighting will be required to register operations with a registered EPR scheme. Producers will be required, amongst others, to pay a levy to the coordinators of these EPR schemes to ensure their waste is diverted from landfill and the environment. This includes collection and recycling initiatives. The funds generated from the EPR schemes should result in investment into both the collection and recycling of materials.

City Invests in Material Recovery Facilities

In addition to the expansion of its recyclables collection range and the development of new waste drop-offs, the CCT is investing over R1 billion in the establishment of four new material recovery facilities over the next ten years to complement Kraaifontein MRF. The Coastal Park MRF is currently under construction, whilst the Athlone, Bellville and Helderberg MRFs are planned.

According to the CCT's draft Waste Sector Plan, Bellville and Athlone MRF are expected to include mechanical, biological treatment capabilities to extract organic waste for beneficiation. However, this may change.

NHE Update

The Athlone private sector Integrated waste management facility (IWMF), previously referred to as the New Horizons Energy Athlone facility, was Africa's first attempt to extract value from mixed MSW at scale but was met with several challenges resulting in its closure. The R400 million facility had a design capacity to process 600 tonnes per day.

Since its closure, the Industrial Development Corporation of SA (IDC) taking over 100% equity. At the time of writing this MIR, the IDC had accepted an unsolicited bid from a consortium of stakeholders and was conducting due diligence. It is expected that facility will operate in 2022.

Mustapha Energy Development

In addition to the material recovery and organic waste beneficiation, the consortium of stakeholders undertaking due diligence on the Athlone private IWMF is also partnering with several stakeholders to establish thermal waste to energy technologies.

The Mustapha Energy development is expected to process between 15 – 700 tonnes per day of unrecyclable residual waste into between 0.2 MWe and 10 MWe of energy.

Waste to Energy Association

The **WT4E** industry association has been established and seeks to foster the development and deployment of thermal waste to energy projects across the continent.

More specifically, WT4E is an umbrella association for thermal waste-to-energy project developers, technologies suppliers, financiers and operators in Africa. Its mission is to raise the level of awareness about thermal waste to energy technologies in African countries, create an enabling environment for waste to energy investments, and encourage the uptake of these technologies.

LEGISLATION, REGULATIONS, AND POLICIES

This section provides a brief overview of major legislation and regulations that govern waste management in South Africa, including anticipated legislation and regulations that are likely to affect investment into the sector.

©Waste Plan

3.1. Waste management regulatory framework

In terms of Section 24 of the 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 SA, this being the National Environmental Management Act (NEMA).

3.1.1. The National Environmental Management Act (Act 107 of 1998)

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

3.1.2. National Environmental Management Waste Act (Act 59 of 2008)

SA has a waste specific act called the NEMWA, or more colloquial referred to as "The Waste Act". It is guided by integrated waste management principles aimed at preventing negative waste-related environmental impacts. There is an array of regulations that are made possible through the NEMWA. Investors and businesses looking to mitigate any investment risks should take into consideration the NEMWA, its regulations and requirements, and the ramifications if it is violated.

3.1.3. Waste Related Licences:

One instrument used to manage environmental impacts, is the environmental impact assessment (EIA) regulations. These EIA regulations list activities that may have a negative impact 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. The EIA process requires a registered environmental assessment practitioner (EAP) to undertake the application[13]. One of the triggers for EIA to be undertaken is through the licensing process:

Waste Management Licence: NEMWA provides a list (**GN921 of 2013**) of specific waste management activities that must undergo a waste management licensing (WML) process if certain criteria are triggered. These activities are deemed to have, or are likely to have, a detrimental effect on the environment, and are differentiated into three categories that have different approval and licensing requirements:

Category A – activities that require a basic EIA
Category B – activities that require a scoping and full EIA process and
Category C – activities that must adhere to specific norms and standards

> Investors / businesses looking to store, recycle or recover, treat, and / or dispose waste must engage with NEMWA's list of listed activities. If they fall within the thresholds of those listed activities, then those activities must be licensed as per NEMWA's listed activities.

Investors / businesses looking to store, recycle or recover, treat, and / or dispose waste must engage with NEMWA's list of listed activities. If they fall within the thresholds of those listed activities, then those activities must be licensed as per NEMWA's listed activities.

[13] All EAPs must be registered with the designated registration authority which is the Environmental Assessment Practitioners Association of South Africa (EAPASA)

Investors / businesses looking to develop / expand waste activities that require a WML must apply for the licence through provincial waste authorities if general waste activities are being applied for, and the DFFE if hazardous waste activities are underway, with the provincial waste authorities engaged as a commenting authority. Engagement with national and provincial authorities should ensure clarity in the process, or confirm whether the activity triggers the need for a waste licence.

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

It should also be noted that several waste beneficiation activities must consider the National Environmental Management Air Quality Act (NEMAQA). This is an air quality specific Act that aims to prevent negative environmental impacts related to air quality.

The NEMAQA also provides a list of activities (**GN893 of 2013**) (as amended) that trigger the need to undertake an air emission licensing process and a subsequently an EIA process. Engagement with local authorities should ensure clarity in the process, or to confirm whether the activity triggers the need for an air emissions licence.

3.1.4. Waste Management Reporting:

Waste generators and handlers triggering certain thresholds stipulated in the National Waste Information Regulations (**R625 of 2012**) must register with and report waste figures to either the national DFFE, through the South African Waste Information System (**SAWIS**); or a provincial waste information system. There are only two provincial waste management information systems currently operating in SA. In the WC, the Integrated Pollutant and Waste Information System (**IPWIS**) is managed by the WC's Department of Environmental Affairs and Development Planning (DEA&DP).

The Gauteng Waste Information System (**GWIS**) is managed by the Gauteng Department of Agriculture and Rural Development (GDARD).

3.1.5. National Waste Management Strategy

The NEMWA is given effect through the NWMS. This strategy outlines government's policy and strategic approach to waste management for SA and includes actions to reach strategic goals. Section 8 of the **NWMS (2020)** provides targets and timelines that affect both the private sector and municipalities (see **Section 2.2.1**). The strategy provides investors / businesses with insights into broad opportunities and some investment certainty. This NWMS will set the foundation for the development of a more tangible waste economy master plan, which is currently being drafted.

3.1.6. Integrated Waste Management Plans

The NEMWA requires all local municipalities to develop an IWMP as part of their IDP[14]. The aim of an IWMP is to give effect to the NWMS and the objectives of the NEMWA; and to include waste-specific operational and support strategies, as well as a schedule of projects and activities.

Like the NWMS, the CCT's IWMP provides investors with insight into future opportunities and reduces uncertainty. (The CCT IWMP is discussed in **Section 2.3.6**.)

3.1.7. Municipal Waste Management Bylaws

Municipalities may regulate how waste is managed within their boundaries through waste specific bylaws. These bylaws often provide obligations for waste generators and waste handlers, including accreditation and reporting obligations.

[14] The IDP is a five-year plan andprincipal strategic planning instrument guiding / informing all planning, development and decisions in the municipality. The City is in the process of developing the 2022/27 IDP.

The CCT has established its own integrated waste management bylaw[15]. The bylaw requires commercial waste generators to have a formal IWMP in place. It also requires businesses recycling, reusing or recovering, or sorting waste, to be accredited. This accreditation requires the approval of an IWMP. The accreditation process can be undertaken online[16]. In addition to the IPWIS reporting requirements, the CCT's bylaw also require commercial waste generators and handlers to report waste figures to the City's Solid Waste Management department. For more information, contact **wastewise.user@capetown.gov.za**.

Businesses performing recycling, reuse or recovery activities, or the sorting of waste, within the CCT boundaries must be accredited with the CCT before commencing activities. Accreditation is an easy process and has many benefits.

Businesses performing recycling, reuse or recovery activities, or the sorting of waste, within the CCT boundaries must be accredited with the CCT before commencing activities. Accreditation is an easy process and has many benefits.

3.1.8. Climate Change Strategy's Waste-related Goals

Municipalities may set waste-related goals in their climate change strategies.
In order to address climate change, the CCT is committed to working towards achieving the following goals within this strategic focus area (SFA) on waste management (SFA 10 – Circular Waste Economy) in its **Climate Change Strategy**[17]:

- **Goal 22:** Develop and implement a sustainable waste management strategy that is financially feasible, and maximises material efficiency by prioritising waste avoidance, reduction, treatment, and recycling in line with provincial targets;
- **Goal 23:** Reduce organic waste disposal to landfill (in line with the provincial integrated waste management plan targets) by 50% by 2022 and 100% from 2027, through better waste separation, treatment and utilisation;
- **Goal 24:** Increase diversion of recyclables from disposal to landfill to 40% by 2025, 55% by 2030, >70% by 2035 and 85% by 2050 Through improved collection, waste separation and providing support to informal workers; and
- **Goal 25:** Reduce the climate and environmental impact of disposal facilities by increasing landfill gas collection efficiency, treatment, and utilisation

3.2. New regulatory updates

Several waste regulatory changes have taken place since the publication of the previous MIR. The following changes are likely to impact waste investments:

Scheduled landfill restrictions (2020/21) (R636 of 2013)
The national norms and standards for the disposal of waste to landfill (R636 of 2013) provide directives for the disposal of waste to landfill. Included in these norms and standards is a list of waste streams that are prohibited from disposal to landfill. **Figure 16** illustrates the various past and future landfill restrictions.

[15] https://openbylaws.org.za/za-cpt/act/by-law/2009/integrated-waste-management/eng/
[16] www.capetown.gov.za/City-Connect/Register/Business-and-trade/Register-as-an-accredited-waste-services-provider
[17] https://resource.capetown.gov.za/documentcentre/Documents/City%20strategies,%20plans%20and%20frameworks/Climate_Change_Strategy.pdf

The following waste streams have been banned from landfilling as of 23 August 2021:

- Brine / waste with high salt content.
- All hazardous e-waste.
- All batteries.
- Persistent organic pollutant pesticides.
- Macro-encapsulation of waste.

Mandatory Extended producer responsibility regulations

The final amendments (**GN400 of 2021**) to the EPR regulations (**GN718 of 2020**) were published in May 2021, and set a framework for the development, implementation, monitoring, and evaluation of EPR schemes for identified products, and which "Producers" of these identified products must adhere to.

Accompanying amendments (**GN20 of 2021** and **GN400 of 2021**) to the three EPR notices for the paper, packaging and some single-use products (**GN1187 of 2020**), electrical and electronic equipment (**GN1185 of 2020**), and the lighting (**GN1186 of 2020**) industries were also published.

Under these regulations, producers (as defined) are mandated to manage their products at end-of-life to grow the downstream reuse and recycling of their materials to achieve targets. They can do this by joining a PRO, form a new PRO, or develop and submit an independent EPR scheme. Obligated Producers had until 05 November 2021 to register with DFFE and ensure that identified products are covered by an EPR scheme.

Composting Norms and Standards (GN561 of 2021)

In June 2021, the norms and standards for organic waste composting came into effect. The objective being to exempt composting facilities processing over 10 tonnes of organic waste a day from requiring a waste management licence, and associated EIA process. The purpose being to provide a "best practice" approach to composting that will prevent / minimise negative impacts on the bio-physical, social and economic environment.

These norms and standards apply to composting facilities that (a) process less than 10 tonnes and (b) more than 10 tonnes a day of organic waste. These norms and standards should reduce the red tape associated with licensing process.

Western Cape Organic Waste Landfill Restriction

To achieve its 2017-2022 IWMP goals[18], the DEA&DP has implemented an organic waste diversion plan that aims to divert 50% of organic waste from landfill by 2022, and 100% by 2027. This will require WC based municipalities to set annual targets, and to identify and implement procedures to meet these targets. Such restrictions should increase the demand for organic waste solutions by private sector and municipalities.

[18] DEA&DP's 2017-2022 IWMP can be found at www.westerncape.gov.za/eadp/files/atoms/files/Western%20Cape%20Integrated%20Waste%20Management%20Plan %202017-2022.pdf

3.3. Anticipated regulations

There are several waste related regulatory items being discussed, which are likely to be promulgated in due course, or will impact in the coming years:

Scheduled national landfill restrictions (R636 of 2013)

The national norms and standards for the disposal of waste to landfill (R.636 of 2013) provide directives for the disposal of waste to landfill, including a list of waste streams that cannot be disposed of at landfill. There are no restrictions expected for 2022; however, 2023 will require 50% of garden waste to be diverted from landfill. **Figure 16** illustrates landfill restrictions beyond 2023. Such restrictions should increase the demand for solutions by private sector and municipalities for the waste streams.

Norms and standards for the treatment of organic waste (GN 275 of 2021)

The draft norms and standards to treat organic waste focus on a wide range of treatment technologies: mechanical, chemical, anaerobic, aerobic, and thermal technologies. The purpose being to provide "best practice" approach to the treatment of organics that minimises negative impacts on the bio-physical, social and economy environment. At the time of finalising this MIR, these norms and standards were not promulgated. Such norms and standards should reduce the red tape associated with licensing process and the associated EIA process for treatment of organic waste.

Plastic carrier bag and flat bag regulations amendments (GN317 of 2021)

The amendments to the Plastic Carriers Bags and Plastic Flat Bags Regulation (R.625 of 2003) were published on 07 April 2021.

These amendments phase in post-consumer recyclate content requirements for plastic carrier bags or plastic flat bags manufactured, traded, or distributed in SA. The first phase kicks in from 01 January 2023 and requires a minimum of 50% post-consumer recyclate to be used. This is to increase to 75% from 01 January 2025, and 100% from 01 January 2027. These regulations should increase the demand for plastic recyclate and subsequently plastic waste recycling.

Tyre Industry Waste Management Plan

In October 2017, SA's first Industry Waste Management Plan (IndWMP) for tyres was withdrawn. Since then, waste tyres have been managed by the DFFE's Waste Management Bureau until a suitable IndWMP can be established. On 29 November 2019, a notice was issued in terms of Section 29(1) of the NEMWA for the Council of Scientific and Industrial Research (CSIR) to develop an IndWMP for tyres. A draft plan was published in March 2020 for public comment. The final IndWMP was not yet published at the time of writing.

3.4. Voluntary commitments

Voluntary agreements are key instruments to illustrate to shareholders / stakeholders an organisation's commitment to change. The below industry commitments provide insights into the actions and demand for waste beneficiation solutions.

SA Plastics Pact

The SA Plastics Pact (**SAPP**) is a multi-stakeholder platform launched in January 2020 to unite SA's plastics value chain – businesses, government, NGOs and other organisations – behind a common vision towards a new plastic economy founded on circular economy principles.

The Pact is used to stimulate innovation, dialogue, and collaboration to unlock barriers to circularity, to create new business models, and generate jobs. Members, which comprise of some of SA's largest consumer brands, commit to meeting four strategic targets (**Table 5**) by 2025[19].

Food Loss and Waste Voluntary Agreement

The Consumer Goods Council of South Africa (**CGCSA**) launched the South African Food Loss and Waste Voluntary Agreement (**SAFLWVA**)[20] in September 2020. The voluntary agreement commits core signatories to align with the United Nation's Sustainable Development Goal 12.3 to halve food loss and waste by 2030. Current signatories include some of SA's largest food brands, including retailers.

Net Zero Certification

The Green Building Council of South Africa's (**GBCSA**) has developed its **Net Zero / Net Positive** waste certification[21].

This certification requires an organisation to reduce, reuse, and recover solid waste for beneficiation with zero solid waste landfilled over the course of the year, or where the building can take waste from other sites and divert it for reuse, and not to landfill. This certification spans the entire lifespan of a building construction, operations, and deconstruction.

Table 5: The South African Plastics Pact's strategic targets by 2025

Target 1	Target 2	Target 3	Target 4
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.**

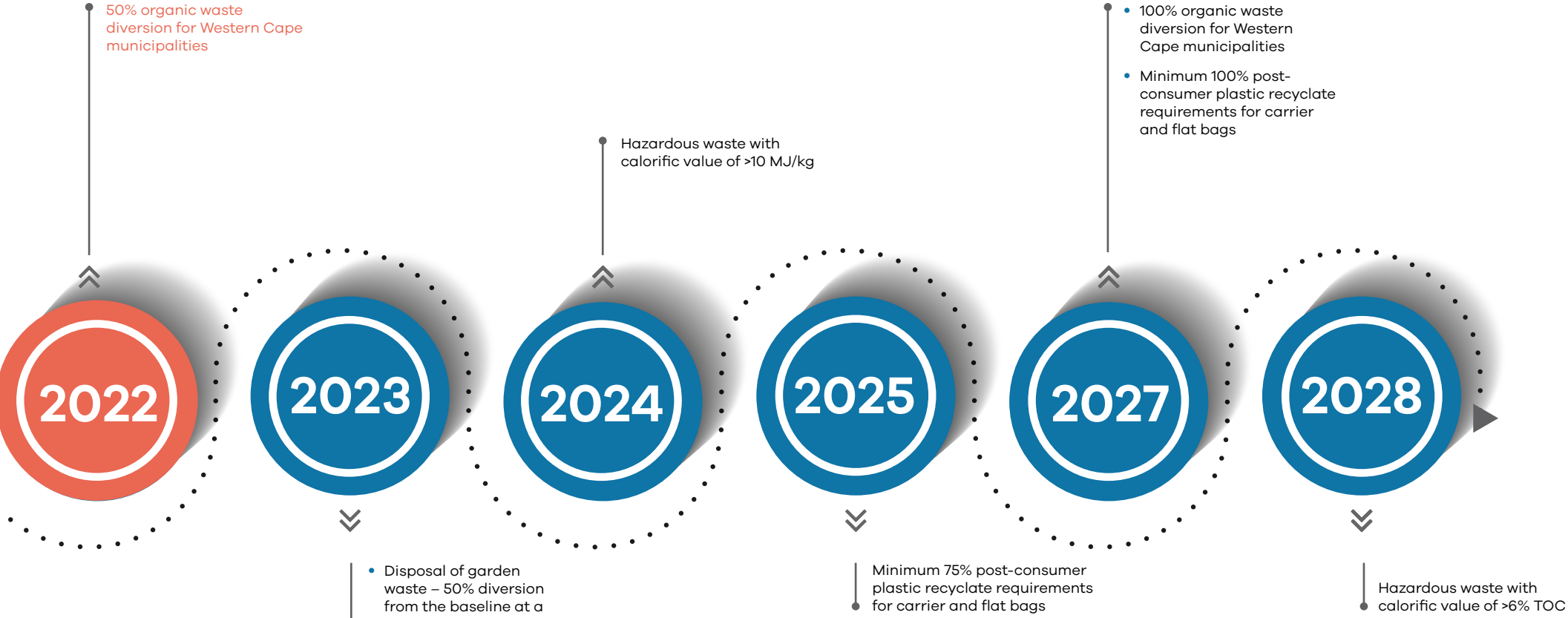
[19] The baseline report can be found at www.saplasticspact.org.za

[20] www.cgcsa.co.za/service-offering/food-safety-initiative/food-loss-and-waste/

[21] https://gbcsa.org.za/certify/green-star-sa/net-zero/

Figure 16: Past and future national and Western Cape landfill disposal restrictions

Source: Extended from Chapter 5(1) of R636 of 2013 accounting for regulatory changes


50% organic waste diversion for Western Cape municipalities
2022
2023
Disposal of garden waste – 50% diversion from the baseline at a particular landfill
Minimum 50% post-consumer plastic recyclate requirements for carrier and flat bags
Hazardous waste with calorific value of >10 MJ/kg
2024
2025
Minimum 75% post-consumer plastic recyclate requirements for carrier and flat bags
100% organic waste diversion for Western Cape municipalities
Minimum 100% post-consumer plastic recyclate requirements for carrier and flat bags
2027
2028
Hazardous waste with calorific value of >6% TOC

OPPORTUNITIES, DRIVERS AND BARRIERS

There are opportunities for value-add investors / businesses in organics, e-waste, plastics, and municipal contracts, some of which are cross-cutting

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

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

With implementing EPR; landfill bans; landfill diversion targets, coupled with large investments into landfill di version, and associational procurement, there are several opportunities for value-add investors / businesses in organics, e-waste, and plastics in Cape Town. **Figure 17** and **Table 6** summarises several opportunities within Cape Town and to some extent the broader WC. It should be noted that it is difficult to estimate the impact that COVID-19 has had on current and future consumption and subsequent waste generation figures. As such, the scale of the opportunities identified should be viewed as indicative only.

Organics: The WC generated between 759 000 – 868 260 tonnes of urban related (MSW, commercial and industrial) organic waste in 2020. The Cape Town metropolitan area was expected to have generated between 538 050 – 619 760 tonnes.

However, based on what was landfilled, the CCT landfilled ~301 780 tonnes and the private landfill landfilled ~83 490 tonnes in 2020. This landfilled waste has a value-add potential of R16.7 million – R3.2 billion.

Plastics: It is projected that the WC generated between 214 307 and 245 103 tonnes of MSW plastics alone in 2020. Assuming these plastics streams were made available, the plastics would have a value of between R321 million – R2.2 billion. At a municipal level, the greatest value lies in the Cape Town metropolitan area, with a projected estimated value of between R225 million and R1.5 billion. However, based on the landfilled numbers, the CCT landfills ~154 471 tonnes and the private landfill landfills ~42 870 tonnes. This results in a range of potential value of R297 million – R1.8 billion

E-waste: The WC generated between 43 290 and 68 501 tonnes of e-waste in 2020. The market value is estimated at between R55.2 and R109.8 million per year. At a municipal level, the greatest value lies in the CCT metropolitan area, with an estimated market value of between R36.5 and R77.4 million. However, based on actual landfilled numbers of ~3 697 tonnes at CCT landfills and ~1 026 tonnes landfilled at the private landfill, this value is between R6.1 – R7.6 million per year based on what is landfilled.

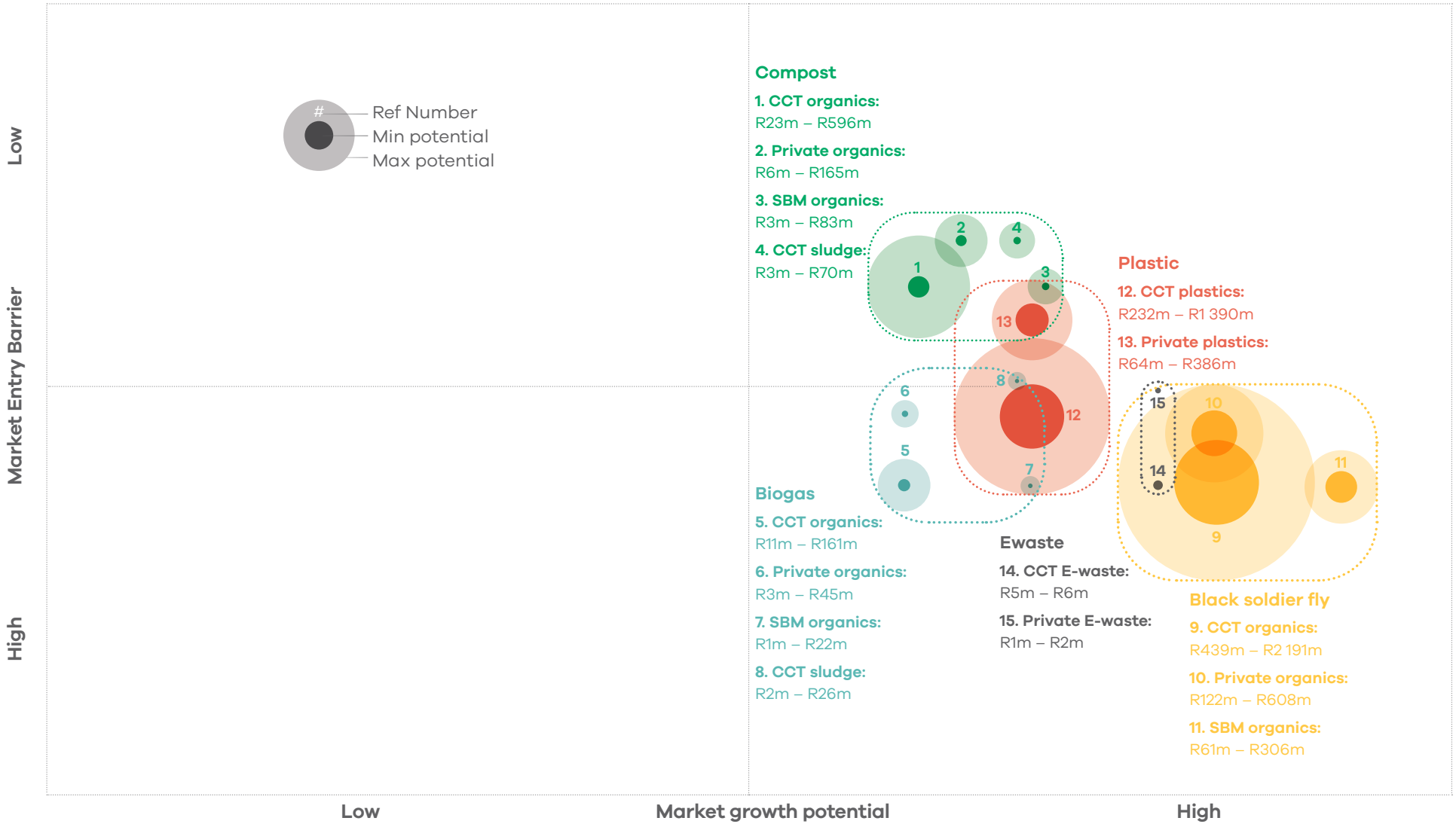

Figure 17: Opportunities prioritisation matrix

Table 6: Summary of waste value-add opportunities

Theme	Opportunity	Driver	Enabler	Barrier / Risks	Term	Macro Context
Organics	**CCT Extracted Organics** **Available:** ~300 835 tonnes per year. **Value potential:** R10.6 million – R2.2 billion.	• Limited municipal landfill lifespan. • Cost of operating landfills. • Climate change mitigation.	• NWMS organic waste targets. • CCT waste sector plan investments. • Organic waste related landfill bans. • Increasing landfill gate / tipping fees. • Organic waste treatment regulations. • Carbon financing appetite. • Food loss and waste commitments. • Industry association support. • Electricity generation / procurement.	• Low cost of landfilling (until 2027). • Inadequate source separation. • Strict end product regulations. • Sensitive off-takers for by-products. • Short / strict municipal procurement. • CCT landfill gas carbon credit programme. • Lack of bio-based heat off-takers. • Low confidence in bio-energy projects.	M-L	• NWMS focus on organic waste. • Operation Phakisa focus on organics. • Greenhouse gas reduction commitments. • CCT electricity generating procuring. • Awareness of the impact of food waste.
	Cape Town Private Sector Organics **Available:** ~83 500 tonnes per year. **Value potential:** R2.9 – R608.9 million.				S-M	
	Stellenbosch Organics **Available:** ~42 000 tonnes per year. **Value potential:** R1.5 – R305.9 million.				M-L	
	CCT WWTW Dewatered Sludge's **Available:** ~72 660 tonnes per year. **Value potential:** R1.7 – R70.2 million.				S-L	
	CCT Dewatered BBF Digestate **Available:** 27 430 – 29 200 by 2024/25, additional 27 430 – 29 200 tonnes by 2034/5, and 27 430 – 29 200 tonnes beyond 2040.				M-L	

Theme	Opportunity	Driver	Enabler	Barrier / Risks	Term	Macro Context
Plastics	**CCT Plastics** **Available:** ~154 471 tonnes per year. **Value potential:** R231.7 mill – 1.4 billion.	• Limited municipal landfill Lifespan. • Cost of operating landfill. • Perceived job potential. • Global / local plastic sentiment. • Climate change mitigation.	• NWMS plastic waste target. • Plastic packaging EPR. • Plastic bag regulations. • CCT waste sector plan. • South African Plastic Pact. • SA Initiative to End Plastic Waste. • Industry association support.	• Competition with higher quality imports. • Slow growth in end-markets. • High levels of contamination. • Unregulated labelling systems. • Virgin plastic price variability. • Accurate plastic statistics.	S-L	• NWMS focus on plastics. • Operation Phakisa focus on plastics. • Consumer awareness. • International commitments. • Transboundary movement – Basel Convention. • African Continental Free Trade Agreement. • South Africa reluctance to join UN global treaty on plastic pollution.
	Cape Town Private Plastics **Available:** ~42 870 tonnes per year. **Value potential:** R64.3 – R385.8 million.				S-L	
E-waste	**CCT Ewaste** **Available:** ~3 697 per year. **Value potential:** R4.8 – R5.9 million.	• Limited municipal landfill lifespan. • Cost of operating landfill. • Perceived job potential. • Precious metal security. • Secondary market demand.	• Lighting and electronics EPR. • National landfill ban. • NWMS focus on e-waste. • CCT waste sector plan. • Rise of electric mobility and renewable energy infrastructure.	• Lack of reliable data. • Access to feedstocks. • Licensing of recycling / recovery facilities. • Cherry-picking of high-value e-waste. • Transboundary movement reluctance.	S-L	• NWMS focus on electronics. • Operation Phakisa focus on e-waste. • International commitments / support. • Transboundary movement (Basel Convention).
	Cape Town Private Ewaste **Available:** ~1 026 per year. **Value potential:** R1.3 – R1.6 million.				S-L	

4.1. Organics

Organic waste[22] is a broad stream that exists in various forms and volumes and managed by various stakeholders: from small inconsistent household volumes that are mixed and highly contaminated, and managed largely by local government; to large industrial and/or agricultural volumes of consistent, homogeneous, and uncontaminated streams that are often managed by the private sector.

Although it is the stream that has the greatest impact on the overall waste system, it has traditionally been the stream with the lowest value proposition and has been diverted more to reduce business overheads and for environmental considerations, rather than being purchased as a feedstock for value-add solutions.

The business case is built on the service offering of diverting waste from landfill (cost saving to generator) as opposed to the sale of an end product such as compost or heat / electricity / fuel. However, this is changing due to a number of regulatory changes and innovative technologies that are upcycling organic waste into high-value products.

As a result, the demand for organic waste is increasing, in particular for clean and homogenous private sector organics. The increase in demand is reflected by the private and public sector investments made to date and planned for the future. This reaction is largely driven by rising landfill costs, private sector diversion commitments / targets, and future national and provincial landfill restrictions; the provincial organic waste landfill restriction the largest driver.

Separating organics from the waste system will increase the quality of organics and subsequent demand for these organics, but also has the added benefit of unlocking the quality and quantity of valuable dry recyclables that otherwise would have a lower value due to contamination. Unfortunately, until concerted effort is made by both private sector and the CCT to ensure source separation takes place, the logical next frontier is on the one hand, how to extract value from potentially highly contaminated MSW organics, and, on the other, how to increase the value proposition of end products for highly regulated end-markets like biogas, compost, and animal feed.

4.1.1. Market overview

Figure 17 shows the distribution of organic waste in the WC for 2015. Although most of the organics produced in the WC are generated by the agricultural sector, the province is not a homogenous entity. **Table 7** and **Figure 18** provide a detailed breakdown of organic waste streams per district municipality / metropolitan area. Although these figures are dated, they do provide an indication of the types of waste that dominate the various municipal landscapes.

Because the focus of this MIR is on the CCT metropolitan area, and because much of the inherent value of urban organics (and subsequent value of other materials) is lost due to co-disposal and landfill, the rest of this section will focus on urban organic waste, which includes an organic component of MSW, commercial and industrial organic waste, and wastewater sludge, and to a limited extent, agricultural opportunities.

[22] National Waste Information Regulations define organic waste as garden waste, food waste and wood waste

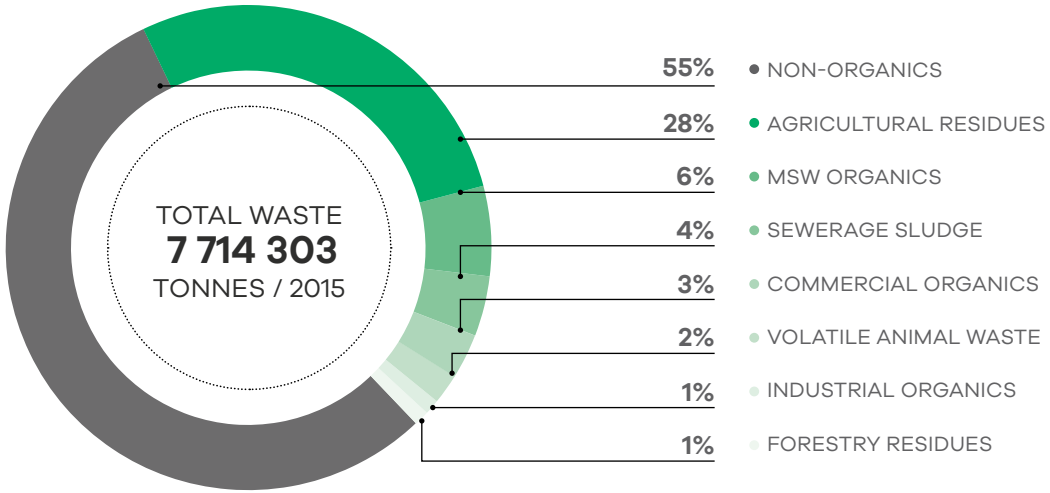

Figure 18: Organic waste relative to total waste generated in the Western Cape

Source: (DEDAT, 2016)

Table 7: Organic waste generated in the Western Cape in 2015

Source: DEDAT (2016)

Municipality / Metro	MSW organics	Industrial	Commercial	Agricultural / abattoir	Forestry residues	Dewatered sewage sludge	Total organics
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**

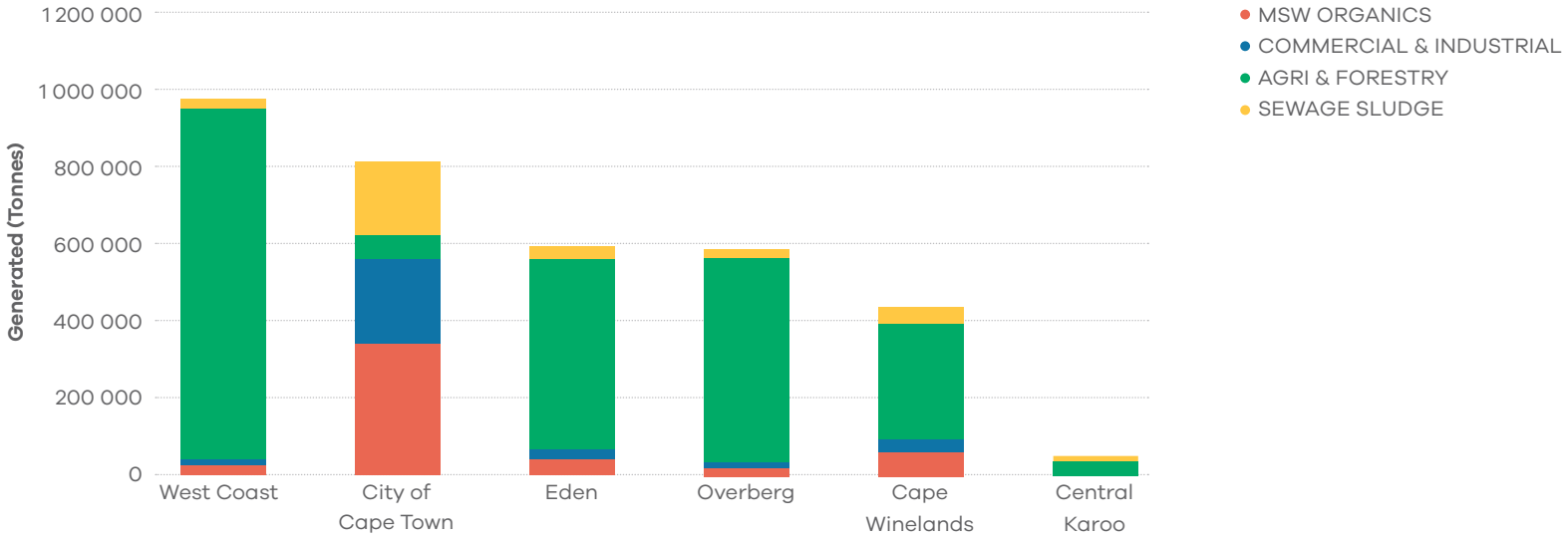

Figure 19: Organic waste generated in the Western Cape in 2015

Source: DEDAT (2016)

Municipal Solid Waste Organics: The WC generated ~489 293 tonnes of MSW organics in 2015. This equates to 20% of the total ~2 387 353 tonnes of MSW generated in the province. For 2020, MSW organic waste generation is estimated to range between 470 293 and 538 416 tonnes and may increase to ~577 450 tonnes by 2025.

The CCT metropolitan area will continue to generate the bulk (~70%) of MSW organics. **Table 8** shows the projected distribution of MSW organics across the municipalities for 2020 and 2024.

Industrial and Commercial Organics: The WC generated ~299 575 tonnes of commercial and industrial organics in 2015. This equates to 34% of the total ~881 101 tonnes of industrial and commercial waste generated in the province.

For 2020, this is estimated to range between 288 232 and 329 844 tonnes, and ~353 921 tonnes by 2025. The CCT metropolitan area will continue to generate the bulk (~72%). **Table 9** shows the projected distribution of commercial and industrial organics across the municipalities for 2020 and 2024.

Table 8: MSW organic waste generated in the Western Cape

Source: Inferred and projected against DEDAT (2016) using GDP growth (Quantec, 2021a) and population growth (Quantic 2021b)

Municipality / Metro	2015 (Estimated)	2020 (Projected)			2024 (Projected[23])
		Generated (t/yr)	Concentration (t/km²/yr)	Per Capita (kg/p/d)	
City of Cape Town	342 505	329 537 – 379 580	140 – 155	0,197 – 0,227	409 406
Cape Winelands	58 715	56 492 – 64 415	2,7 – 3,0	0,165 – 0,188	68 896
Central Karoo	4 893	4 708 – 4 975	0,1 – 0,1	0,173 – 0,183	5 005
Garden Route	39 143	37 661 – 40 985	1,7 – 1,8	0,167 – 0,182	42 236
Overberg	19 572	18 831 – 21 559	1,6 – 1,8	0,173 – 0,198	23 145
West Coast	24 465	23 539 – 26 902	0,8 – 0,9	0,140 – 0,160	28 761
Western Cape	**489 293**	**470 767 – 538 416**			**577 450**

[23] Projected tonnages are based on population (Quantec 2021) only and exclude expected GDP.

Table 9: Industrial and commercial organic waste generated in the Western Cape

Source: Inferred and projected against DEDAT (2016) using GDP growth (Quantec, 2021a) and population growth (Quantic 2021b)

Municipality / Metro	2015 (Estimated)		2020 (Projected)			2024 (Projected)	
	Ind. (t/yr	Comm. (t/yr)	Ind. (t/yr)	Comm. (t/yr)	Concentration (t/km²/yr)	Ind. (t/yr)	Comm. (t/yr)
City of Cape Town	76 490	140 232	73 594 – 84 770	134 922 – 155 412	85,25 – 98,19	91 431	167 623
Cape Winelands	11 877	21 775	11 427 – 13 030	20 951 – 23 889	1,51 – 1,72	13 937	25 551
Central Karoo	517	948	497 – 526	912 – 964	0,04 – 0,04	529	970
Garden Route	8 441	15 476	8 121 – 8 838	14 890 – 16 204	0,99 – 1,07	9 108	16 699
Overberg	3 665	6 719	3 526 – 4 037	6 465 – 7 401	0,82 – 0,93	4 334	7 946
West Coast	4 742	8 693	4 562 – 5 214	8 364 – 9 559	0,42 – 0,47	5 575	10 219
Western Cape	**105 732**	**193 843**	**101 729 – 116 415**	**186 504 – 213 429**		**124 913**	**229 008**
	299 575		**288 232 – 329 844**			**353 921**	

Wastewater sludge: The WC generates ~98 185 dry tonnes of wastewater sludge per year. The. CCT generates ~199 dry tonnes a day of dewatered sludge from all its wastewater treatment works (WWTW). This adds up to 72 660 tonnes per year and equates to ~74% of the provincial production.

Almost half of this (~97 tonnes per day) is partially stabilised waste activated (secondary) sludge, whilst the remaining ~44 tonnes per day is primary (raw) sludge and ~58 tonnes per day is blended sludge.

Landfilled: It is difficult to estimate the amount of organic waste generated within municipal boundaries, let alone estimate the impact that COVID-19 has had on consumption and waste generation. However, it is easier to estimate the amount of organics going to landfill. **Figure 20** illustrates the estimated amount of waste going to the Cape Town landfills (municipal and private).

Using the CCT's 2018 waste characterisation study (CCT 2018), it is possible to estimate the types of organics that make up this landfilled waste. Unfortunately, the waste characterisation for the private landfill is not available.

Recycling capacity

Cape Town hosts a diverse number of organic waste recycling operations. These operations have the combined capacity (not actual processing) to process ~296 951 tonnes per year in 2021. This is expected to grow to ~538 070 tonnes by 2027, with several new public and private facilities coming online. Facilities vary from small-scale private and community-based composting operations to large-scale composting, biogas and black soldier fly operations. There are currently nine facilities that process over ten tonnes of post-consumer mixed organics a day. The processing capacity of these facilities equates to 82% of the expected total process capacity for Cape Town by 2022. The remaining 18% processing capacity comprises smaller operations solutions and a city-wide home composting initiative.

Figure 21 shows the current and future capacities of existing and potential solutions able to beneficiate commercial, industrial, and MSW organic waste generated in Cape Town. Note this is for organic waste generated, not landfilled. The processing capacity for agricultural streams is excluded. It should also be noted that this excludes the organic waste generated by the neighbouring local municipalities and those not too distant: Overstrand, Stellenbosch, Drakenstein, Swartland, and Theewaterskloof. These municipalities will also likely be needing solutions to organic waste in the coming years.

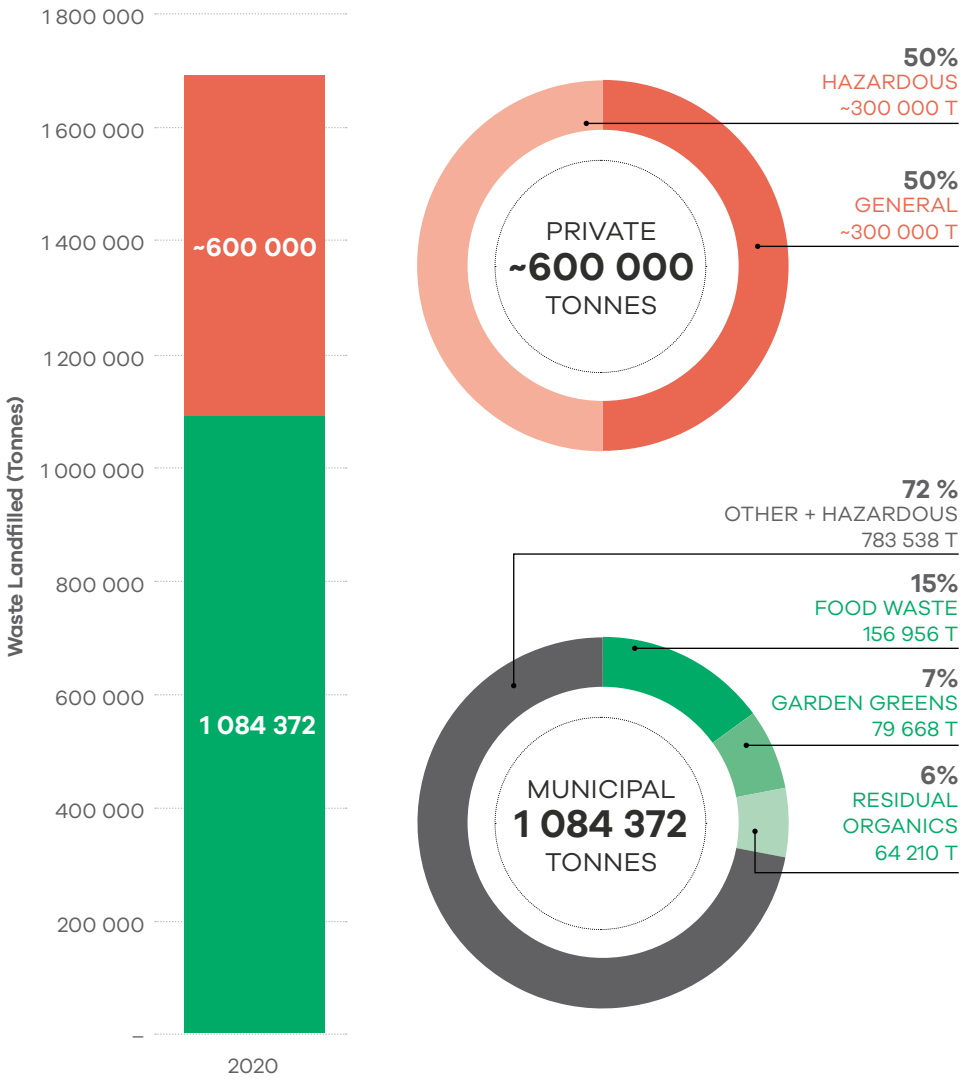

Figure 20: Organic waste landfilled in Cape Town in 2020 relative to total landfilled

Source: CCT (2021d) and CCT (2018)

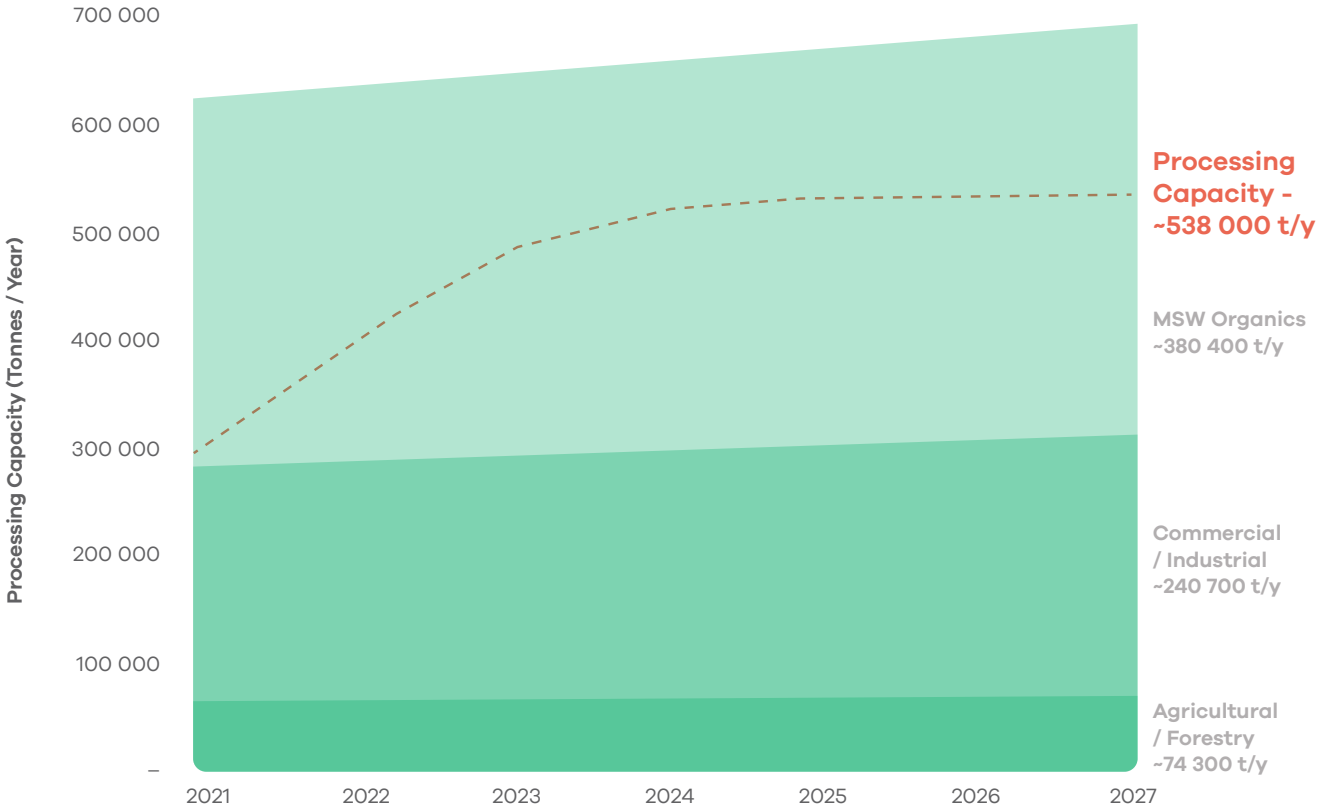

Figure 21: Organic recycling capacity compared to expected generation in Cape Town

Source: GreenCape

4.1.2. Opportunities

Cape Town hosts a diverse mix of organic waste solutions. Traditionally, the organic waste sector struggled to secure viable business cases. However, rising cost of landfilling, progressive regulations, investments, and upcycling innovation is changing this. Assuming organics were extracted, the potential value potential rangers between R16.7 million and R3.2 billion per year[24], but excludes revenue potential from gate fees (see **Section 2.3.4**).

[24] The values vary due to the price variations associated with products produced by a diverse range of solutions, notably within the organics space whereby the difference between and within solutions vary.

Table 10: Value potential multipliers per tonne of input organics

Source: Industry engagements and websites

Technology	Value add potential (R/tonne organics)
	Minimum – Maximum
Soil / Compost	R75 R1 980[25]
Biogas	R48 R726
Black Soldier Fly	R2 028 R10 170

Soil / Composting: Assuming composting would be able to beneficiate all of Cape Town's ~384 325 tonnes of food waste and garden greens; as well as Stellenbosch municipality's ~42 000 tonnes of future extracted organics, and the CCT's WWTW ~35 442 tonnes of sludge, value-add potential ranges from a conservative R34.6 million to a highly optimistic R914.3 million in soil enhancing related products.

Biogas: Assuming anaerobic digestion would be able to beneficiate all of Cape Town's ~282 547 tonnes of food related waste; as well as, Stellenbosch local municipality's ~30 877 tonnes of future extracted food related waste, and the CCT's WWTW ~35 442 tonnes of sludge, the value-add potential ranges from a conservative R16.7 million to a highly optimistic R253.3 million in electricity and/or heat.

Black Soldier Fly: Assuming black soldier flies would be able to beneficiate all of Cape Town's ~275 228 tonnes of non-meat food related waste; as well as, Stellenbosch local municipality's ~30 070 tonnes of future extracted non-meat food related waste, the value-add potential ranges from a conservative R622.2 million to a highly optimistic R3.1 billion in protein, oils and soil enhancing related products.

More specifically, the following opportunities should be investigated:

CCT Extracted Organics: The CCT landfilled ~300 835 tonnes of organic waste in 2020. To meet its landfill diversion target of 100% diversion by 2027, the CCT is developing several initiatives to divert organics. This includes four new MRFs to complement Kraaifontein MRF. It is too early to confirm, but two options are being assessed to treat the organics.

[25] The high value potential is through vermicomposting

Both seek to mechanically remove the organic fraction from in-coming MSW; however, one seeks to treat the organics onsite, whilst the other seeks to transfer the organics to a CCT treatment facility or to the private sector facility. Depending on the technology, the potential value-add ranges from R10.6 million – R2.2 billion per year.

Private sector organics: Of the ~300 000 tonnes of general waste landfilled at Cape Town's only private landfill, a conservative estimated of ~83 500 tonnes is organic. To meet the landfill diversion target of 100% diversion by 2027, the landfill owners (Enviroserv and Averda) will need to divert the organics. Depending on the technology, the potential value extraction ranges from R2.9 - R608.1 million per year.

Stellenbosch extracted organics: By 2023, the Stellenbosch local municipality will be in demand for non-landfill solutions to ~42 000 tonnes a year of organic waste (**Section 2.4**).

The primary waste stream includes mixed organics from households, some organics from manufacturers, hospitality and shops. It is anticipated that the Stellenbosch local municipality will outsource collection and beneficiation to the private sector, including Cape Town based solutions. Depending on the technology, the potential value extraction ranges from R1.5 – R305.9 million per year.

Cape Town's wastewater sludges

The CCT will be in demand for non-landfill solutions to ~72 660 tonnes per year (equivalent to ~199 tonnes per day) of dewatered WWTW sludge's[26]. The current disposal service level agreement ends in June 2023. In response to the national landfill ban on liquid waste (**Figure 16**), and the future provincial landfill restriction on organics (**Section 3.3**), the CCT is likely to include non-landfill specifications in future tenders.

It is worth noting; the CCT seeks to establish its first Biosolids Beneficiation Facility (BBF) by 2024/25. A second facility is being investigated around 2034/35 and a third facility considered for future investigation. However, if alternative solutions exist, the CCT may consider reviewing its second and third facility plans. Leading up to 2024/25, the CCT will need a short-term solution to all ~199 tonnes a day of dewatered WWTW sludges, with application to land for farming likely to be re-specified as the solution for ~97 tonnes of the total. Once the first BBF is operational, the demand for sludge solutions will be reduced to ~35 440 tonnes per year. Depending on the technology, the potential value extraction ranges from R1.7 million – R70.2 million per year. For more details, see GreenCape's **industry brief**[27].

Biosolids beneficiated digestate

In the long term, the CCT's demand for sludge landfill diversion will be replaced with a demand for non-landfill solutions for thermally treated and dewatered digestate cake. The intention of the CCT is to make the digestate cake available to the private sector to further beneficiate through a tender process that will likely include progressive specifications. Once the first BBF is commissioned in 2024/25, the CCT will need non-landfill solutions to between 65 – 80 tonnes a day of treated and dewatered digestate cake. This is expected to increase by an additional 65 – 80 tonnes per day by 2034/35, and another 65 – 80 tonnes per day sometime beyond 2040. Digestate quality and quantity data are anticipated to be made available once the first BBF has been commissioned. For more details of this opportunity, see GreenCape's **industry brief**.

[26] A summary of the quantity and classifications can be found on GreenCape's website (www.greencape.co.za/content/city-of-cape-towns-wastewater-sludge-quality-and-quantity/)

[27] https://www.green-cape.co.za/assets/Sludge-Beneficiation-Brief_30_6_21.pdf

4.1.3. Drivers / Enablers

Western Cape 2027 organic waste landfill restrictions

The greatest market driver in the WC will be the provincial landfill restrictions for organics (see Section 3.2). The WC's DEA&DP has 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. It will likely only unlock feedstocks in the medium term. The lead-up time provides solution providers time to investigate opportunities, secure feedstocks, and navigate the regulatory landscape.

Cost of landfilling

Although the cost of landfilling is relatively low in SA compared to benchmarks in more developed economies, waste generators still regard landfilling as a costly overhead, especially in the WC. The CCT has the highest landfill gate fees (R557 excl. VAT / tonne in 2021/22) than any of the other metros in the country. This is expected to increase above inflation in the coming years. Before the provincial organic waste landfill restrictions are fully realised in 2027, the cost of landfilling will be a key enabler for an alternative to landfill solutions for private sector organic waste.

NWMS organic waste related targets: Of the thirty-two targets identified by the DFFE's recently published NWMS (see Section 2.2.1), three are especially relevant to organic waste solution providers. These targets should drive the demand for organic waste solutions, both at a national scale, but also within the WC and the CCT. Key actions in the NWMS to note are:

- **Action 7:** develop guidelines and / or norms and standards for composting of spoilt foods.
- **Action 11:** develop and implement an enabling environment for the production of biogas treated sewage and organic domestic waste. This includes developing and implementing a strategy and regulatory framework by 2022.
- **Action 13:** inclusion and implementation of organic waste technologies into municipal IWMPs. Metropolitan areas are required to meet this target by 2021, district municipalities by 2023, and all municipalities by 2025. The intention is to have 35 projects established nationally by 2025.

Climate change

The CCT recognises the role waste contributes to the climate change crisis. Methane arising from landfilled organic waste and from wastewater treatment has resulted in the waste sector being responsible for 10–11% of citywide GHG emissions. Of this, solid waste contributes ~95% of this. Goal 23 of the CCT **Climate Change Strategy** and, subsequently, **Climate Change Action Plan**, focuses on the diversion of organic waste from landfill. Action 23.1 seeks to maximise diversion of garden waste and food waste through key interventions. This action plan has been highly influential in informing the CCT's Waste Sector Plan and, subsequently, its IWMP.

Chemical and Waste Phakisa: Of the twenty initiatives driven through the Chemical and Waste Operation Phakisa to fast-track waste diversion, three initiatives focus on organic waste and should actively facilitate increasing national demand for organic waste solutions:

- 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 metropolitan municipalities.

City of Cape Town Waste Sector Plan

In order for the CCT to meet its NWMS diversion targets and the province organic waste landfill targets of zero organics landfilled by 2027, and the Climate Change Strategy, the CCT has included several organic waste related actions and projects (**Section 2.3.6**). These include new waste drop-offs, establishment of four new MRFs, of which two of include mechanical biological treatment (MBT) technologies to extract organic waste, and separation at the source of organic waste. These initiatives will no doubt result in the extraction of organic waste. Although it is not yet clear what the CCT plans to do with the organics, the city is investigating whether to process the waste themselves or outsource beneficiation to the private sector. This should unlock both private and MSW organics.

Carbon Tax Act (Act 15 of 2019)

Section 13 of SA's Carbon Tax Act provides offset allowances for heavy greenhouse gas 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 the demand for carbon credits. The climate change component must be built into the business plan early, as most carbon standards do not cover projects that include a climate change component as an afterthought. Certain standards allow for the grouping of small projects into a single umbrella programme. As such, small organic solution activities may benefit from combining activities under a larger single programme. In the context of organic waste, there is scope for rural or urban farmers who are also large-scale beneficiaries of organic waste to obtain carbon credits via three avenues:

- Beneficiation of organic waste that would otherwise have been landfill, and would have otherwise produced methane under (see **Section 4.1.4**);
- Increasing soil organic carbon by displacing synthetic fertilizers with carbon rich end products; and
- Displace fossil-based Scope 2[28] energy sources.

Abattoir waste landfill restrictions:

Under the national Norms and Standards for the Disposal of Waste to Landfill (**R.636 of 2013**), abattoir waste must be disposed of at a Class B landfill. Other than Cape Town based Class B landfills, the local municipalities surrounding Cape Town are obligated to refuse to accept abattoir waste. Abattoirs will have to implement onsite solutions or outsource landfill diversion to alternative solution providers.

Liquid waste landfill restrictions:

Under the national Norms and Standards for Disposal of Waste to Landfill Disposal (**R.636 of 2013**) as of August 2019, all liquid waste is banned from landfills. The banning of liquids strengthens the business case for beneficiation of liquid wastes containing organics.

Composting Norms and Standards

The national norms and standards for organic waste composting (**GN 561 of 2021**) were promulgated in June 2021 (see **Section 3.2**). This progressive best practice approach is expected to reduce regulatory barriers for composters processing over 10 tonnes of organic waste per day.

[28] Scope 2 emissions are indirect GHG emissions associated with the purchase of electricity, steam, heat, or cooling.

Organic Waste Treatment Norms and Standards

The proposed national norms and standards to treat organic waste (**GN 275 of 2021**) are expected to reduce the regulatory barriers for a wide range of treatment solutions (including but not limited to anaerobic, aerobic and thermal solutions) for a wide range of specific organic waste streams. These norms and standards are expected to be promulgated in the first quarter of 2022.

Food loss and waste commitment

Several external and internal commitments have been announced by some of SA's largest brand owners (see **Section 3.4**). These commitments bode well for not only food loss and waste reduction and recovery solutions but also for food waste beneficiation solutions. The SAFLWVA commits core signatories[29] to reducing food loss and waste by 50% by 2030.

Through its 10x20x30 initiative[30], Pick n Pay has committed to supporting its 20 priority suppliers to also reduce food loss and waste by 50% by 2030. In addition to external commitments, several organisations have made internal commitments to their stakeholders to divert organics from landfill. GreenCape has identified 33 companies within Cape Town who have officially documented internal and external commitments.

Compostable packaging

To aggregate small units of decentralised organics at scale, such as those at household level, a simple and convenient mechanism is needed to encapsulate and subsequently collect the organics that do not compromise the quality of the organics. One way is by plastic bin bags. However, a major barrier to using such a bag is contamination by plastic, especially with bag splitting.

Truly compostable bags to unlock household organics have been touted as a solution to plastic contamination. However, compostable bags are a relatively new technology in SA and require specialised technology to process at municipal scale and carefully developed and enforced regulations. The Compostable Plastics Council (COPCO) is a PRO works closely with Organic Recycling Association of South Africa (ORASA) to achieve this. COPCO is an industry body established to promote the growth, development, and education of compostable plastics in SA. The body has also registered itself as a PRO (see **Section 3.2**) to support the management of compostable packaging in SA at their end of life to achieve EPR targets.

Feeding bio-based electricity onto the national grid

The sale- and wheeling of electricity to the grid has been hampered by regulatory barriers and requirements. However, major changes have taken and are taking place at a local level that may strengthen the business case for waste to electricity related markets:

- The Department of Mineral Resources and Energy gazetted new rules that allow municipalities in good financial standing to formulate energy plans that do not rely solely on the government-run energy utility, Eskom. Some metropolitan municipalities, including the CCT, have undertaken initiatives to purchase electricity from independent power producers, to on-sell electricity to their customers. See the GreenCape's **2022 Renewable Energy MIR** for more information.

[29] As of October 2021, a total of 27 core signatories.

[30] Pick n Pay is one of South Africa's largest retailers and a founding member of the 10x20x30 initiative.

- Independent Power Producers (IPP) within the renewable energy generation space are now exempted from applying for a generation licence if their facility is below 100MW capacity. The facility would still need to register with the National Energy Regulator of South Africa and adhere to grid code and connection regulations.

- The off-take agreement options for local embedded electricity generators have increased as a result of electricity wheeling. Electricity wheeling will allow generators to "wheel" their electricity to a willing buyer anywhere within a municipality or country. Several municipalities, including the CCT, are in the process of establishing wheeling frameworks to enable electricity generators and offtakes to use the existing electricity grid.

  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 its own use. SSEG already enjoys regulatory implementation in most of the WC municipalities.

These changes at municipal level complement legislative updates at a national level, including, for example, the gazetted Integrated Resource Plan 2019 and changes to the Electricity Regulation Act. 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 **2022 Renewable Energy MIR** and **2022 Energy Services MIR**.

Electricity Pricing and Security

Coupled with increasing energy tariffs, electricity load shedding is an ongoing liability for South African businesses for coming years. This risk is increasing the demand for technologies that can manage demand and provide energy security. Bio-energy technology options that can in particular assist business in providing a way to add value to their existing waste streams generated, treating wastewater and generating an energy supplement that can be used on site are highly attractive. Examples of businesses that can benefit are those in the agriculture and agri-processing sectors, as well as businesses within industrial hubs that have both organic waste residues suitable for these bioenergy technologies and a seasonal and/or high energy demand.

Wheeling help desk

The South African Independent Power Producers Association (IPPA) is developing a wheeling helpdesk for its members. As a part of the process, they are assessing the current status of wheeling within municipalities and across various energy technologies. Waste-to-energy solutions looking to strengthen the business case by securing offtakes for energy are well advised to engage the association to leverage this wheeling helpdesk.

Biogas air emissions licence clarification

The DFFE has provided formal clarification to the biogas industry that biogas production does not fall under Category 10 (animal matter processing) of the NEMAQA (**Act 39 of 2004**) Listed Activities[31] (**GN893 of 2013**).

[31] 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.

Businesses operating or looking to operate in the organic waste space should consider joining ORASA and/or Southern African Biogas Industry Association (SABIA) as members. Both industry-driven associations promote organic recycling, as well as support their members.

DFFE has also confirmed that although Subcategory 1.4 (gas combustion installations) of the listed activities still applies 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 output do not require an air emissions licence. This should reduce the cost, delays, and risks associated with the EIA process for smaller biogas facilities.

DibiCoo online matchmaking platform

The European Union's Horizon 2020 Research and Innovation funded Digital Global Biogas Cooperation (DiBiCoo) has developed an **online matchmaking platform** for biogas and gasification technologies[32]. The platform facilitates bi-directional partnership and is considered as an additional marketing option for EU companies; as well as, an asset for stakeholders in the partner countries to network and connect with European stakeholders. The online platform also acts as an information hub for available technologies; a database of EU and non-EU companies; a marketplace for opportunities related to biogas and gasification projects; a B2B matchmaking tool; and a convenient networking service between actors of importing and exporting markets. This includes opportunities for biogas and gasification projects to engage with financing and funding institutions.

UNIDO Digestate Beneficiation Guidelines

UNIDO is working with various national departments, including the DFFE, Department of Mineral Resources and Energy (DMRE), and the Department of Trade, Industry and Competition (DTIC) implementing the Project entitled "Promoting organic waste-to-energy and other low carbon technologies at small, medium and micro enterprises (SMME) scale: Accelerating biogas market development in South Africa"[33]. As part of the capacity building and technology support component of the project, the project issued a request for quotation for an assessment of current digestate management and beneficiation and the development of digestate management and beneficiation guidelines expecting these guidelines would be published by June 2022.

Fertilizers, Farm Feeds, Agricultural Remedies and Stock Remedies Act

Organic waste solution providers are often competing with livestock farmers for access to organic waste feedstocks such as pre-consumer and post-consumer food waste. Although feeding food waste to animals may seem like a sustainable option, this poses several potential health risks to animals and humans. The Fertilizers, Farm Feeds, Agricultural Remedies and Stock Remedies Act (FFFARSRA) (**Act 36 of 1947**) governs, amongst others, the registration of farm feed and the importation, sale, acquisition, disposal or use of farm feeds.

[32] DibiCoo's matchmaking platform can be found at https://dibicoo-matchmaking-tool.appspot.com/

[33] UNIDO project ID 130310. https://open.unido.org/projects/ZA/projects/130310

Table 3 of the Act's regulations related to farm feeds (**R1087 of 2006**) prohibits the feeding of very specific feedstocks to farm animals, most notably: Faeces, urine as well as separated digestive tract content resulting from the emptying of removal of the digestive tract., solid urban waste, untreated waste from eating places, and the packaging and parts of packaging or the use of products from the agri-food industry. These regulations are key to ensuring not just animal wellbeing but also provide justification for organic waste generators to use organic waste solutions.

Draft Feeds and Pet Food Bill

In some cases, farmers seek to cut feed costs by utilising unsold food crops / residues to manufacture animal feed for onsite use. This onsite manufacture and use is not covered by the FFFARSRA. However, amendments to regulations related to farm feed (and also pet food) called the Feeds and Pet Food Bill (**GN42230 of 2019**) have been proposed and are expected to be promulgated in 2022. These amendments will cover onsite production and use of feed.

If farmers using onsite feed production methods cannot register their feed as animal feed, there will be a need for alternative methods of disposal of organic waste / residue streams, and thus strengthen the demand for alternative organic waste solutions.

Industry Associations

Several organic waste related associations have been established to provide support to their members and associated industries. New and existing organic waste solutions should consider leveraging this support but at the same time joining as members to ensure effective representation. See **Appendix D** for contact details:

- The Organic Recycling Association of South Africa (**ORASA**) promotes organic waste recycling in SA and focuses largely on unlocking the supply of organic waste for its wide spectrum of members.
- Southern African Biogas Industry Association (**SABIA**) promotes the uptake of specifically biogas in SA.
- **WT4E** promotes largely thermal waste to energy solutions in Africa.
- The BSF industry is in the early stages of developing the Southern African Mass Insect Rearing Organisation (**SAMIRO**) to promote the insect rearing industry and its access to organics and end markets for products.
- Fertiliser Association of South Africa (**FERTASA**) represents the fertilizer industry of SA. This includes supporting its members by navigating the registration of fertilizers and compost.
- The Compostable Plastics Council (**COPCO**) was formed in March 2020. The purpose of the council is to promote the use specifically of compostable plastics. The council advocates for responsible import, manufacturing, use management, and post-consumer waste management of compostable plastics. COPCO is also registering an EPR scheme for compostable.

4.1.4. Risks / Barriers

Inadequate source separation

Contamination of organic waste by non-organic dry waste streams or hazardous streams is a major barrier that limits the available value-add solutions. This is particularly the case for MSW organics. This limits the marketability of both end-products and by-products of solutions. Until separation either at source or outside source is actively and aggressively implemented and enforced in SA, it is unlikely that sensitive organic solutions will thrive, or that the business cases for solutions that rely on end products will be strong. This will likely change in the medium to long term with increased investment by municipalities into separation at sources programmes.

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 likely very high, with inconsistencies and variability in volumes and the character of feedstocks. In order to secure viable markets for compost or digestate to be used and sold to fortify soils, the end products need to be certified as such. This certification is heavily regulated[34]. The benefits of certification are that the certified products can be sold at a higher price than non-certified products, thus improving the business case. The FERTSA is well placed to assist composters with navigating this certification process.

Competition with unregulated pig farmers

Organic waste solution providers are competing with livestock farmers, mainly small 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 solution and therefore is not governed by the NEMWA and the associated regulations. However, although not governed by the NEMWA, feeding livestock, any organics, including organic waste, is governed by the Fertilizers, Farm Feeds, Agricultural Remedies and Stock Remedies Act (FFFARSRA) (**Act 36 of 1947**) and associated amendments. 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 often give or sell their waste to farmers. There could also be waste generators who flout the regulations wilfully, for example some farmers themselves, or third-party logistics companies.

Cost of landfilling

Although landfilling waste is regarded as an overhead for private organic waste generators, it is still relatively low compared to more developed economies. As such, organic waste solutions should have cheaper gate fees than landfill. This is often difficult when markets for end products are limited, and gate fees are the major source of income. Nevertheless, with future landfill restrictions, this barrier should no longer be relevant.

Carbon credit double counting organic waste solutions

(Composting, Biogas, Black Soldier Fly etc.) have two potential avenues to generate carbon credits and strengthen business case. One is to replace a GHG intensive source - fossil fuel, chemical fertilizer etc. The other way is to divert organics from methane producing landfills.

However, no organic waste solutions diverting organics from CCT landfills can claim carbon credits through a reputable crediting system (for example Gold Standard or VCS). This is because the CCT has established LFG extraction, thus the carbon savings is being undertaken by the CCT, and thus crediting organic solutions with credits would result in double counting. A further challenge is that with the provincial organic waste landfill ban expected in 2027 (100%), solutions diverting organics from WC based landfills will not be able to secure carbon credits as of 2027. This is due to Clean Development Mechanism (CDM) projects not being able to claim credits if there is a regulation banning a particular activity, such as the ban of organics to landfill.

[34] Fertilizers, Farm Feeds, Agricultural Remedies and Stock Remedies Act 36 of 1947, as amended.

Access to / sale via the electricity grid

The South African electricity market is currently managed on a "single-buyer" model by the state-owned entity, Eskom. Eskom handles the generation and transmission of electricity and controls a minority share of the distribution market. The majority of power supply to the national grid is procured through competitive bidding processes, such as Renewable Energy Independent Power Producer Procurement Programme (REIPPPP). However, although challenges remain for organic waste solutions to benefit from electricity as a revenue stream, there have been significant regulatory changes influencing local municipalities: lifting of the SSEG cap from 1 MW to 100 MW, the development of wheeling frameworks, and the issuing of energy trading licenses. This is leading to a progressively more distributed electricity market.

WC municipalities are leading the way in this trend, with many of these opportunities being explored through the Municipal Energy Resilience Programme. See **Energy Services MIR**[35] for more details.

Lack of a gas heating grid

The business case of waste-to-energy projects, especially in the European context, is often pegged to not just the sale of electricity but also through the sale of heat. Heating is often enabled through the distribution of gas via a national grid, or steam or hot water via a local grid. This business case is often more attractive in colder climates with district heating infrastructure. However, SA does not host a central heating market, other than in very specialised cases. As such, selling gas for heating to a grid is an unlikely market opportunity. As such, waste-to-energy solutions interested in the sale of heat will need to identify niche markets and business requiring large heat demand.

Saturation of solutions:

Cape Town has a wealth of organic waste solutions. This includes a diverse spectrum of solutions from highly sensitive solutions like biogas, to more forgiving solutions like composting. However, most of these companies are focused on commercial and industrial organics. Based on engagements, Cape Town has sufficient solutions to cater for its commercial and industrial organics. It is for the highly contaminated MSW organics where solutions are needed.

Legacy issues for biogas

GreenCape's engagements indicate that some financial institutions and investors are losing confidence in bioenergy projects. However, it should be noted that this is shifting owing to a united effort by SABIA and its members. Various factors have affected the viability of biogas projects in SA, including the technical, performance and credit risks associated with:

- types, quality and security of feedstock;
- availability of realistic revenue streams and clients;
- the cost of managing by products such as digestate;
- the project/stakeholder structure and location;
- the choice of technology and related expertise;
- the conditions of contract agreements; and
- a lack of skills and/or transfer of skills to operate facilities.

4.1.5. Recent developments

National Food Loss and Waste Strategy: The DFFE recently put out a call for a professional service provider to develop SA's strategy for reducing food losses and waste prior to retail, i.e., that which is associated with harvesting, processing and transport of food-to-food producers and retailers. At the time of drafting this MIR, as service provider had yet to be adjudicated.

[35] www.green-cape.co.za/market-intelligence

Update to national food waste figures

The CSIR (2021) has updated SA's food loss and waste figures from 2013. The objective of the study was to support SA's domestication of United Nations SDG 12.3 by generating local, reliable scientific data and evidence on food loss and waste across the food supply chain for different food types.

Of the 22.8 million tonnes of food produced and/or imported in SA each year, ~10.3 million tonnes is never consumed. This equates to 34.3% of local production, but 45% of the available food supply (production plus imports fewer exports) in the country. **Figure 22** illustrates where along the food value chain loss takes place.

It is worth noting that 45% of losses are in the production stage, which would typically be considered as part of private sector commercial and industrial waste. This suggests that this is a key focus area for organic waste solutions, particularly those that can retain and return value to the economy.

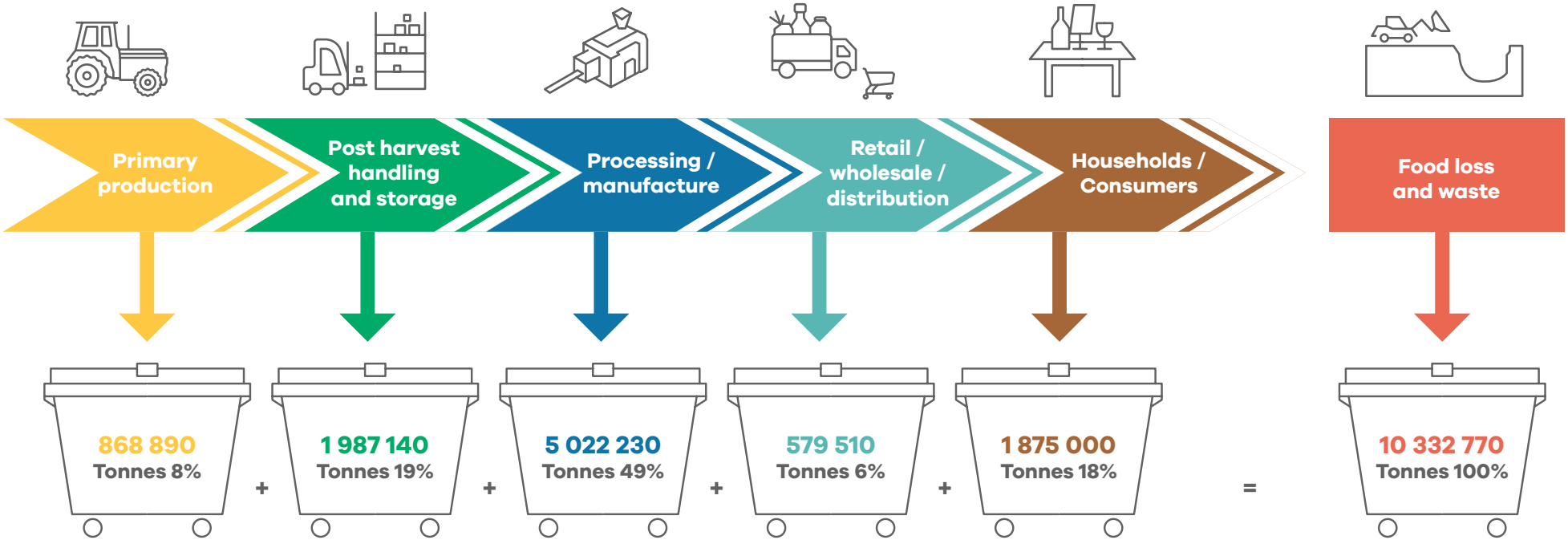

Figure 22: Distribution of food loss and waste along South Africa's food value chain

Source: CSIR (2021)

Municipalities submit organic waste strategies

As part of the WC DEA&DP's organic waste strategy, all municipalities within the WC are required to develop organic waste diversion plans that meet the organic waste diversion targets. These plans are to be submitted to the DEA&DP. At the time of finalising this MIR, these plans were not yet made public. Once they are made public, these plans will provide investors and businesses an indication of where opportunities lie within the respective municipalities.

Municipal mechanical biological treatment

The CCT will make large infrastructure investments into organic waste extraction and potential beneficiation. This includes upgrading its existing Athlone Refuse Transfer Station (RTS) to include a clean MRF (Phase 1), and also an MBT plant (Phase 2). The expansion is currently in its pre-application phase. The CCT is also budgeting for the establishment of a second MBT facility at its planned Bellville RTS.

Stellenbosch Organic Waste Transfer Facility

The Stellenbosch local municipality has received its authorisation to develop an organic waste transfer station. The facility will be designed to process 3 000 – 3 500 tonnes a month of organic-rich mixed waste from municipal solid waste, and pure organic waste from business. The purpose of the facility is to aggregate and pre-process organics to make available to the private sector. The municipality is unlikely to dictate the offtake solution, as long as it diverts organics from the landfill. Off-takers would likely be responsible for the collection and processing of wastes transferred through the transfer facility, and any residual waste would be transported and disposed to landfill by the off-takers.

The South African AgriCarbon Programme

The **Climate Neutral Group** has launched its AgriCarbon Programme. This is SA's first carbon programme, paying farmers for the carbon credits they generate from sustainable land management practices that improve soil quality. Practices that increase the soil organic carbon can generate carbon credits sale to willing buyers to offset their carbon footprint. Although this programme does not affect organic waste solutions directly, it strengthens the demand for high soil carbon supplies. Organic waste solution producing high carbon products, such as compost or organic fertilizers, should consider understanding how to partner with farmers looking to shift away from chemical fertilizers to increase the carbon content of their soils at scale. This in effect strengthens the demand for their carbon rich products.

Athlone Private Sector Integrated Waste Management Facility

The Athlone private sector IWMF was Africa's first attempt to extract value from mixed MSW at scale. The facility cost R400 million to construct and had a design capacity to process 600 tonnes per day of mixed MSW, with the organic waste component expected to process 200 tonnes a day into biogas. At the time of writing this MIR, the IDC had accepted an unsolicited bid from a consortium of stakeholders and was conducting due diligence. It is expected that facility will operate in 2022.

Insect Rearing Industry Association

SA, notably the WC, enjoys several BSF solution providers. In light of the changing regulations concerning organic waste treatment and animal feed regulation, the BSF industry must be included. The industry is subsequently early stages of developing the SAMIRO. The focus will be to promote waste related and non-waste related value chains, and will include, among others, unlocking barriers to organic waste access and end markets for both protein and nutrient rich fras.

4.2. Plastics

SA has a well-established plastic collection and recycling industry compared to other more developed economies. The success is largely due to industry associations facilitating the material supply for recycling and market demand for recyclate. Plastic recycling is still largely operating within classic economics (supply and demand) and has a strong business case in SA. This viability can be attributed to SA's relatively cheap labour and a highly active but marginalised waste picker sector.

However, recycling rates have shown slow growth over the past couple of years and do not align with the efforts undertaken to increase these rates. However, this is expected to change in the coming years with implementing progressive regulations, including the EPR regulations, commitments to industry-driven agreements, and investments into large municipal material recovery infrastructure and initiatives, most notably in Cape Town. The various initiatives and levers should see further support for plastic recycling in SA in the next five years.

4.2.1. Market overview

Plastics resin produced

SA consumed ~1.74 million tonnes of plastic polymers in 2020. This is 5.6% lower than the previous year's ~1.84 million tonnes. However, the polymer market is still highly dominated by virgin polymers, which make up 83% of polymer consumption. This is down from ~1.50 million tonnes in 2019 to ~1.44 million tonnes. The remaining 17% local consumption was made up of recyclate. Of the total 312 600 tonnes of recyclate produced, 296 500 tonnes were consumed locally and 14 755 tonnes exported. The local dependence on virgin polymers is illustrated in **Figure 23**. **Figure 24** illustrates this dependency in more detail for each of the major polymers for 2020 only.

Figure 23: Total consumption of virgin and recycled plastics in South Africa in 2020

Source: Plastics|SA (2021)

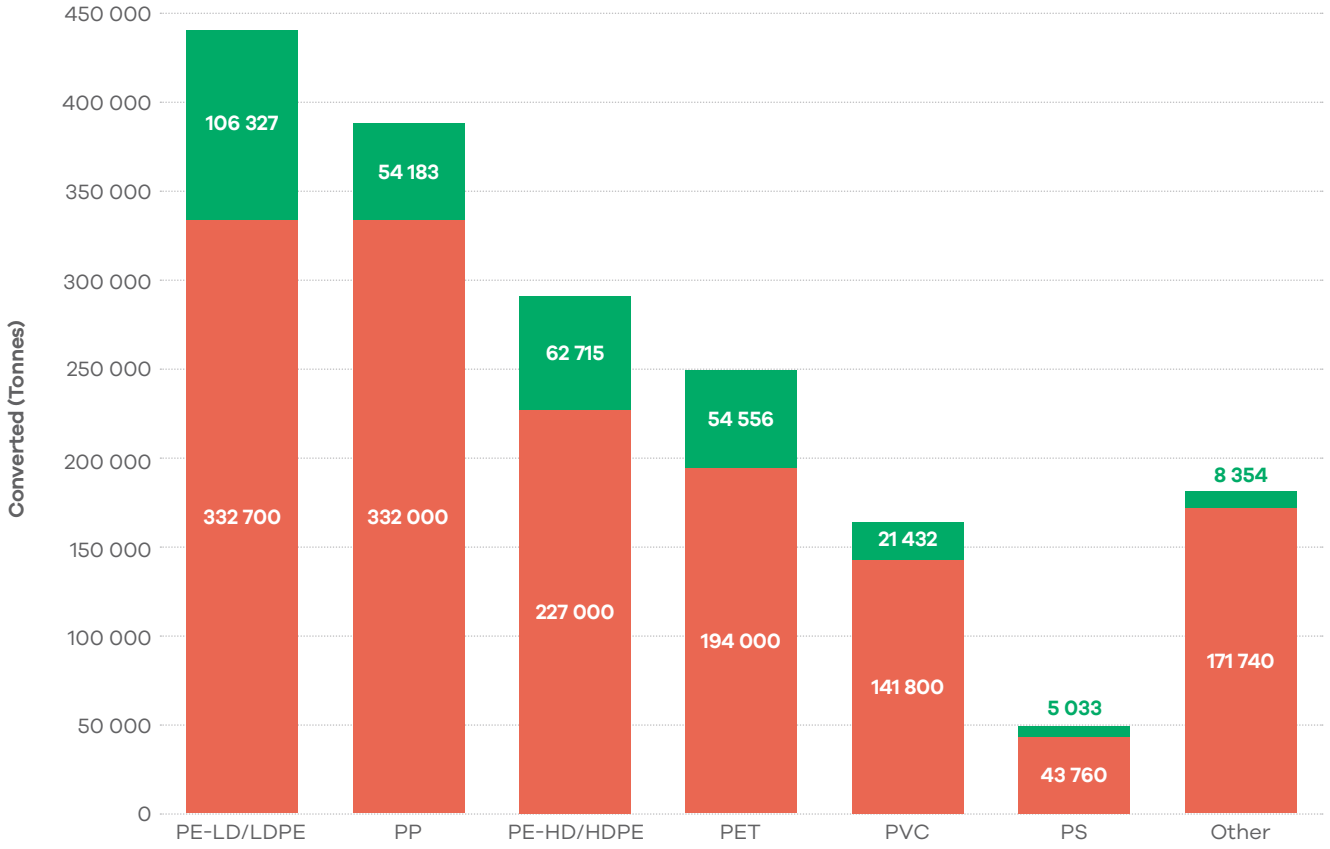

Figure 24: Consumption of virgin and recycled by major polymers in South Africa 2020

Source: Plastics|SA (2021)

Plastic waste generated

Determining the amount of plastic waste generated by SA is extremely difficult. This is largely because it is not fully understood how much material is entering SA, for example, as packaging on imported products[36]. What is known is the amount of virgin polymer consumed in the country, coupled with recyclate produced by recyclers. Combining the two sets of figures provides an indication of the material used for manufacturing of plastic products from virgin and recycled plastic. **Table 11** provides an indication of a plastic fraction of MSW for WC municipalities, whilst **Figure 25** illustrates the extrapolated distribution of plastic waste generated and plastic recycling across SA[37].

[36] WWF (2020) estimated South Africa was a net importer of ~ 180 000 tonnes of plastic packaging on products in 2018.

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

Table 11: MSW plastic generated in the Western Cape

Source: Inferred and estimated against DEDAT (2016) using GDP growth (Quantec, 2021a) and population growth (Quantic 2021b)

Municipality / Metro	2015 (DEDAT [2016])	2020 (Projected)			2024 (Projected)
		Generated (t/yr)	Concentration (t/km²/yr)	Per capita (kg/p/d)	
City of Cape Town	155 919	150 016 – 172 797	63,7 – 70,6	0,09 – 0,10	186 375
Cape Winelands	26 729	25 717 – 29 324	1,2 – 1,4	0,08 – 0,09	31 364
Central Karoo	2 227	2 143 – 2 264	0,1 – 0,1	0,08 – 0,08	2 278
Garden Route	17 819	17 144 – 18 657	0,8 – 0,8	0,08 – 0,08	19 227
Overberg	8 910	8 573 – 9 815	0,7 – 0,8	0,08 – 0,09	10 537
West Coast	11 137	10 715 – 12 246	0,4 – 0,4	0,06 – 0,07	13 093
Western Cape	**222 741**	**214 307 – 245 103**			**262 873**

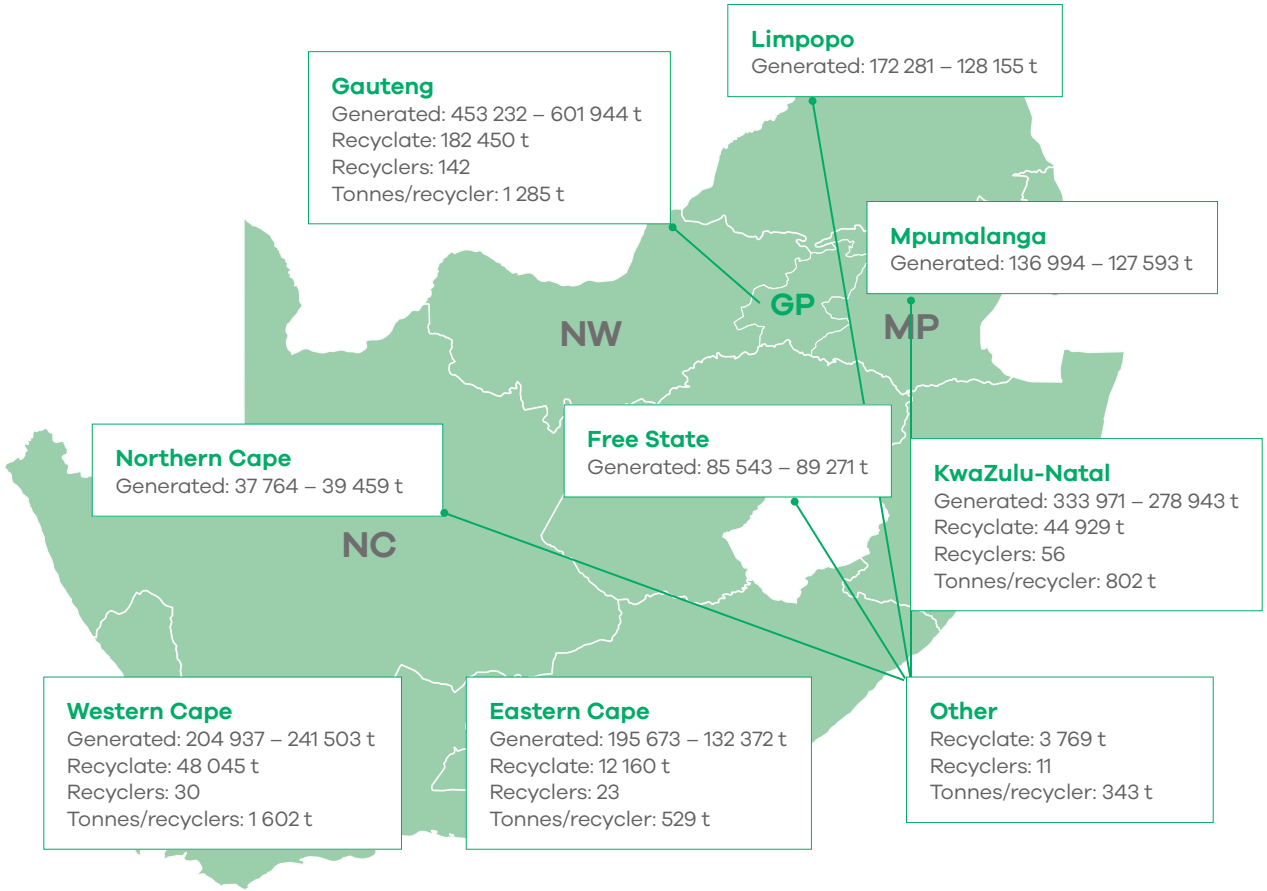

Figure 25: Provincial distribution of plastic waste generated and recycled in 2020

Source: Adapted from Plastics|SA (2021), Quantec (2021a) and Quantec (2021b)

Plastic landfilled

It is difficult to estimate how much plastic waste is generated in a municipal boundary. However, it is easier to estimate the amount of plastics disposed of at landfill. **Figure 26** illustrates the estimated amount of waste going to Cape Town's landfills (municipal and private). An estimated 154 470 tonnes of plastic were landfilled in CCT's landfills in 2020. Unfortunately, the waste characterisation for the private landfill is not available. As such, an estimate of plastic landfilled at the private landfill is not available. However, if the CCT waste characterisation were applied to the private sector landfill numbers, an unreliable estimate would be ~42 870 tonnes of plastic landfilled in 2020.

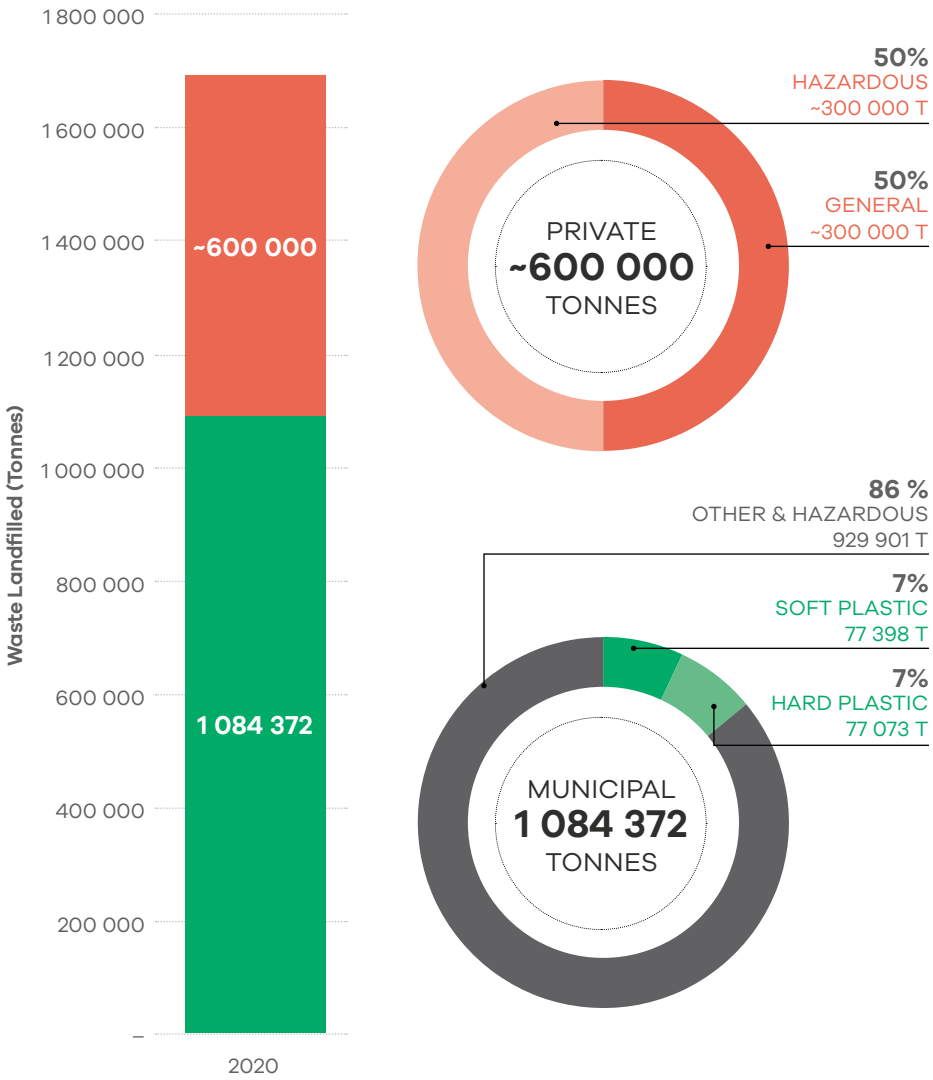

Figure 26: Plastic waste landfilled in Cape Town in 2020 relative to all waste landfilled

Source: CCT (2021d) and CCT (2018)

Plastics recycled

SA's collection and aggregation network is driven by a strong and competitive processing and recycling sector. Its 276 identified recyclers processed 461 499 tonnes of input material to produce 312 600 tonnes of plastic recyclate. In 2020, 20% of the recyclers manufactured 70% of the recyclate, and the top 10 recyclers manufactured 32% of the recyclate (Plastics|SA, 2021). **Figure 27** illustrates for each province the number of recyclers, aggregated tonnage of recyclate manufactured, and average recyclate produced per recycler. Although the WC's 30 recyclers produce less recyclate in total than Gauteng, they have the highest average amount of recyclate manufactured per recycler compared to the other provinces. This being 1 602 tonnes.

Of the ~461 499 plastic material collected for recycling in 2020, most (~64%) plastic material was obtained from post-consumer sources, including material extracted from landfills. Almost half (~44%) plastic material was procured from formal collectors and waste management companies. It should be noted that these formal operations act as entry points from the informal sector and buyback centre material too, even though it is not reflected as such. **Figure 28** illustrates the source of materials for recycling in 2020, whilst **Figure 29** illustrates from which stakeholder the material was procured by in 2020.

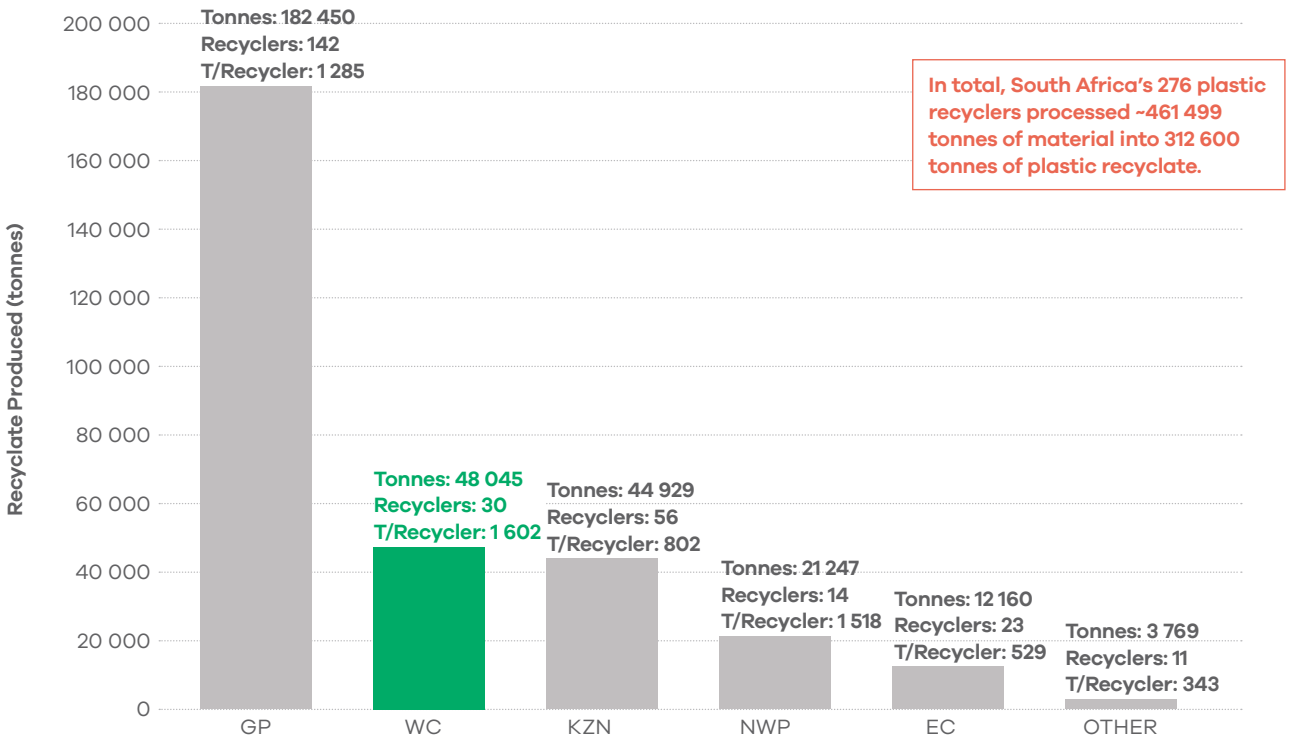

Figure 27: Plastic recyclers per province and total recyclate produced in 2020

Source: Plastics|SA (2021)

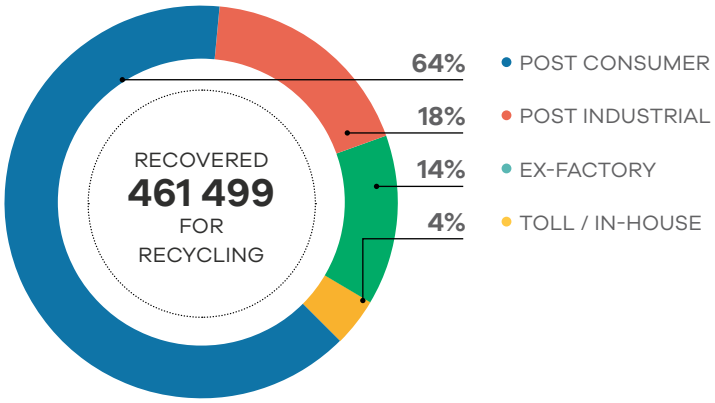

Figure 28: Source of plastic material recovered for recycling in 2020

Source: Plastics|SA (2021)

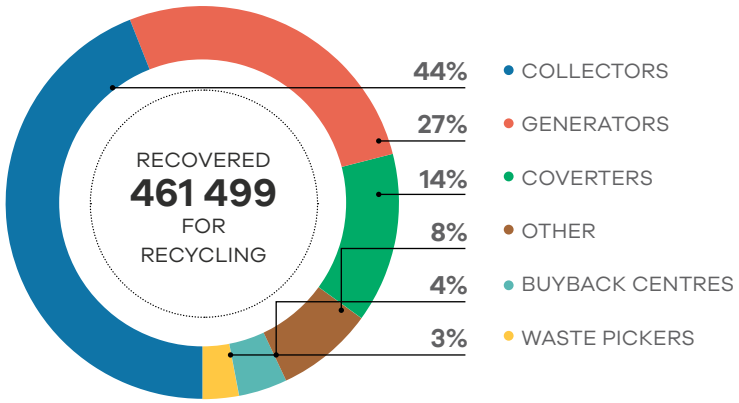

Figure 29: Stakeholder material was procured from for recycling in 2020

Source: Plastics|SA (2021)

4.2.2. Opportunities

It is projected that the WC generated between 214 307 – 245 103 tonnes of MSW plastics in 2020. If a conservative range of between R1 500 (low value dirty loose low-density polyethylene (LDPE)) and R 9 000 (high value clean bailed high-density polyethylene (HDPE)) per tonne, then the plastics would have a total low-end recycling value of R321 million in 2020 and a high-end recycling value of R2.2 billion in 2020[38]. At a municipal level, the greatest value lies in the Cape Town metropolitan area (71% of waste) with an estimated value of between R225 million – R1.5 billion in 2020. However, based on actual landfilled numbers of ~154 471 tonnes at CCT landfills and ~42 870 tonnes at the private landfill, this value is between a low value of R296.0 million and a highly optimistic R1.8 billion per year.

4.2.3. Drivers & enablers

National Waste Management Strategy focus on plastics

Through the NWMS, the DFFE has committed to facilitating the diversion of 40% of waste from landfills within five years; 55% within 10 years; and at least 70% within 15 years. To achieve this, the NWMS includes several key actions that are directly related to plastic recycling (see **Section 2.2.1**). These actions should facilitate both the supply of quality plastic feedstocks and stimulate demand for plastic recyclate.

Chemical and Waste Phakisa:

Of the twenty initiatives driven through the Chemical and Waste Operation Phakisa to fast-track waste diversion, five initiatives impact directly and indirectly on plastic waste and should actively facilitate increasing national supply and demand for plastic waste solutions:

- The packaging guideline initiative seeks to develop a national packaging design guidelines and establishing a Green Grading Certification Scheme.
- Facilitate the establishment and implementation of Packaging EPR in SA to fund and support plastic packaging waste collection and recycling.
- The 50% household organic separation at source by 2023 initiative seeks to enforce separation at source requirements on municipalities, in particular metropolitan municipalities. (This is expected to enable greater recycling of plastics due to decreasing contamination).
- Establish seventeen MRFs and six plastic pelletizing plants to facilitate the collection and processing of plastic waste.
- Establish five refuse derived fuel (RDF) plants (pilot) throughout SA to convert absorbent healthcare product waste, including plastic containing nappies and sanitary products, into fuel for waste to energy solutions.

Plastic bag regulations

The amendments to the plastic bag regulations (**Figure 16**), plastic carrier bags, and plastic flat bags must be made from a minimum of 50% post-consumer recyclate as of 1 January 2023, 75% from 01 January 2025, and 100% from 01 January 2027. As plastic bags are a large sink for recyclate, these regulations should stimulate the demand for specifically post-consumer LDPE plastics, with some increase in demand too for HDPE plastics.

[38] Value range is based on the price recyclers are paying: lowest value of R1.50 / kg of very dirty loose LDPE to highest value of R9.00 / kg of cleaned bailed clear white HDPE

Plastic packaging extender producer responsibility

Demand for recyclate, and subsequent demand for recyclables, will be driven through implementing the EPR schemes (see **Section 3.2**). The EPR regulations will support education and awareness, increase collection and supply of plastic packaging, increase the market demand for recyclate, and ensure quality feedstocks and subsequently lower processing overheads for recyclers.

The EPR schemes will be administered by registered PROs, who will be responsible for the collection, management and disbursement of EPR levies. These levies will be used, amongst others, to subsidise collection and recycling of plastics. Investors / businesses should contact the PROs to understand how to leverage their support and EPR levies to secure feedstocks, de-risk investments, and increase competitiveness.

The South African Plastic Pact

The **SA Plastics Pact** (see **Section 3.4**) commits signatories to four targets aimed at stimulating the further development of a circular economy for plastic in SA. These targets will stimulate both the supply of plastics for recycling and the demand for plastic recyclate. They will seek to eliminate problematic plastics and facilitate growth in circular business models, such as those involving reusable packaging. Signatories to the SA Plastics Pact will implement various initiatives to meet these targets.

The South African Initiative to End Plastic Waste

The South Africa Initiative to End Plastic Waste was formed in 2019. Six working groups were established, and have representation from industry, government and civil society:

1) Product standards and certification;
2) Product design, development and innovation;
3) Integration of the informal waste economy;
4) Biodegradable and compostable plastics;
5) Infrastructure; and
6) Consumer education and awareness.

Climate change

Goal 24 of the **Climate Change Strategy** and subsequent **Climate Change Action Plan**, focuses specifically on the diversion of recyclables from landfill, with action 24.1 seeking indicating the scaling and expansion of the Think Twice separated at source programmes; Action 24.2 focuses on behaviour change, and Action 24.3 seeks to implement mandatory segregation of recyclables at all municipal buildings. This action plan has been highly influential in informing the CCT's Waste Sector Plan and, subsequently, its IWMP.

City of Cape Town Waste Sector Plan

In order for the CCT to meet its NWMS diversion targets, and the Climate Change Action Plan, the CCT has included several plastic and packaging waste related actions and projects in its long-term Waste Sector Plan and shorter term IWMP (**Section 2.3.6**). These include new waste drop-offs, establishment of four new MRFs, and expansion of its separation at source programme. These initiatives will no doubt result in the extraction of plastic related waste streams. Although it is not yet clear how, it is likely the city will outsource operations of these to the private sector to then shift plastic material to recyclers. This should unlock of both private and MSW plastics.

Industry bodies

Several plastic waste related associations have been established to provide support to their members and associated industries. Furthermore, a number of registered PROs to manage EPR schemes.

Providers or new and existing plastic related solutions should consider leveraging this support but at the same time joining as members to ensure effective representation. See **Appendix D** for contact details:

- **Petco:** the PET recycling company promotes recycling efficiency in the production, design, conversion, collection and recycling of post-consumer PET plastic. It should be noted that PETCO has announced it will diversify into other plastic materials.
- **Polyco:** The Plastics Responsibility Organisation aims to grow the collection and recycling of plastic packaging in SA, to promote the responsible use and reuse of this plastic packaging and to end plastic waste in the environment.
- **Plastics|SA:** represents all sectors of the South African plastics industry, including polymer producers and importers, converters, machine suppliers, fabricators and recyclers.
- **SAPRO:** The South African Plastics Recycling Organisation represents the plastics re-processors in SA. Its members procure sorted, bale end-of-life plastics and re-process it into secondary material.
- **COPCO:** The Compostable Plastics Council was formed in March 2020 to promote the use specifically of compostable plastics. The council advocates for responsible import, manufacturing, use management, and post-consumer waste management of compostable plastics.
- **WT4E:** promotes largely thermal waste to energy solutions in SA.

4.2.4. Risks & barriers

Importing high quality plastic
The national DFFE has indicated it is opening applications for the importation of plastic waste into SA. This will be regulated under the outlining and mandate of the Basel Convention. The main reason for this decision is to plug a shortage of certain plastics in the country. Although this may be seen as a positive step to securing recyclable plastic feedstocks, SA is currently battling to divert its own plastics. This poses a threat to local plastic collectors, most notably SMMEs, who would have to compete with the higher quality imported plastics and deal with the glut in the market of high-quality recyclable plastics.

Slow growth in end-markets
There must be a market demand for material. In the past, the recycling sector sustained itself through growth in end-markets for recyclate.

Although the EPR schemes intend to stimulate alternative and additional demand for recyclate, SA has experienced low economic growth over the past few years, even prior to the COVID-19 pandemic. However, the direct dependence of demand on economic growth is expected to change in the coming years with several progressive regulatory requirements that will shift the liability from consumers and government to producers, and private sector commitments to limit plastics waste.

High levels of contamination
It is estimated that 64% of plastic that is recycled is sourced from post-consumer sources, including landfill. With low separation at source levels in SA, recycling feedstocks are often of poor quality due to contamination by other materials, including organics. Process related wastage could be as high as 36% – 40% for post-consumer films[39].

[39] Plastics|SA 2021 notes 36% whilst Plastics|SA 2020 notes 40%

This increases the pre-processing and disposal overheads and, subsequently, reduces the business viability. However, with large investments by the CCT into material recovery and separation at source, it is likely that the Cape Town based recyclers may experience cleaner feedstocks as the CCT infrastructure ramps up.

Alternative plastic contamination
A key requirement for ensuring an end-market for 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 / use of biodegradable / compostable and oxo-degradable materials as an alternative to plastic packaging. The plastic industry believes these alterative materials affect the long-term integrity of the recyclate for long-use plastics products.

Unregulated labelling systems
There continues to be confusion amongst consumers on what materials / products are recyclable. As such, even when collection services for recyclables are available, and separation at source is undertaken, consumers often dispose of non-recyclable plastics into their recyclables bin thinking these materials are recyclable. This shifts the burden of disposal onto the collectors who either dump or pay for disposal, thus reducing the business viability. Although some brands have developed on-pack recycling labels (OPRL) to communicate recyclability to consumers, this is not regulated or standardised, and as such brands provide inconsistent and misleading recycling information. However, the SA Plastics Pact is in the process of developing standardised OPRLs across all packaging streams, building on the OPRLs developed by Woolworths, and subsequently the Sustainable Retailers' Forum and WWF SA. However, industry is hesitant to accept strict OPRLs specification.

Narrow focus of initiatives
There are several key industry initiatives and associations driving landfill diversion. However, many of the initiatives are disjointed and are not collaborating. This is largely because many of the initiatives are funded by members and are focused on specific plastics or stakeholders along the value chain. This is not a fault of the initiative / associations, but rather the source of funding that determines focus. It is hoped that with EPR and expected collaboration, this changes.

Plastic price volatility
Plastic recyclate must compete with virgin material. Because plastic is produced from crude oil, the price of virgin material is directly related to the price of crude oil. As a result, the demand for recyclate reduces with a drop in oil prices, and subsequently a drop in virgin material prices. When oil is below US$65/barrel, the business case for recycling plastic mechanically becomes challenging (McKinsey and Company, 2018). Even when oil prices drop temporarily with a concurrent drop in virgin plastic prices, this can have a devastating long-term impact on recyclers and their supply chains who are not able to weather short-term crises. Once a recycler shuts down, and with it, their supply chain, it is extremely difficult to re-establish itself.

Accurate plastic estimates
Although there is an understanding of the amount of virgin and recycled resin converted into products, there is no visibility on the tonnages of plastic packaging imported and exported on products. The import and export of plastic as packaging or products can be gauged from trade data, providing the items are appropriately coded. 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. For example, SA could export high quality recyclable packaging offshore but importing low quality and difficult-to-recycle packaging.

This should be resolved to some extent with implementing EPR schemes, which will require importers (and exporters) to report on plastic packaging on products placed on the market in South Africa.

4.2.5. Recent developments

CCT invests big into plastics recovery

The CCT seeks to include several material recovery projects into its longer term Waste Sector Plan and its shorter term IWMP (see **Section 3.3.6**). Of particular relevance are investments into four new MRFs to complement the existing Kraaifontein MRF, expansion of its drop-offs from 26 to 35, and expansion of its "Think Twice" separation at source programme. These investments will no doubt increase access to plastics for the plastic.

Plastic recycling annual survey

Each year, the Plastics|SA and SAPRO publish their annual plastic recycling survey for SA. This annual document provides a wealth of insights for investors and businesses within the plastic recycling sector. The most recent 2021 report has been published and provides information and insights for 2020[40].

Plastic PROs expand into other plastics

In response to EPR regulations, PETCO and POLYCO have announced that they will broaden their focus to all plastic types. This means a "Producer" using plastic resin numbers 1,2,3,4,5,6 or 7 now has two PROs to choose from and to join as part of EPR regulations and levies. This also means plastic recyclers have two PROs to seek support from. It should also be noted that the Vinyleloop and Polystyrene Association of South Africa have merged with POLYCO.

Extrupet invests in renewable energy

To tackle the rising cost of energy, energy security, and climate change, Extrupet, one of the largest and advanced recyclers of plastics on the African continent has invested in 3MWp solar infrastructure (annual generation capacity of 2GWh) at its Wadeville plant in Gauteng. It is set to bring down electricity costs by an estimated 30% from the first month and save around R130 – R140 million over the course of the lifecycle of the solar plant.

Plastics into building material

There is growing interest in including problematic plastic waste into building material. The Khaya Khanya Atlantis lightweight concrete factory was launched in Atlantis in November 2021. The factory is expected to process >25 tonnes a month of expanded polystyrene and will help to increase its recycling rate by at least 5% within the first year.

Centre for Regenerative Design and Collaboration's (CRDC) Resin8 Cape Town pilot plant is being upgraded to a full-scale plant that will be able to accept up to 500 tonnes per month of mixed plastic waste.

[40] The Plastics|SA survey can be found on their website www.plasticsinfo.co.za/recycling/

4.3. Electronics

The term e-waste refers to electrical and electronic equipment that has reached the end of life, or perceived end of life. In SA, e-waste is classified as both general and hazardous waste, depending on materials included / extracted.

In general, it is hazardous, 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 WC 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 WC 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.

SA 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 implementing the EPR regulations for the electronics and lighting sectors.

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

Source: as per data source

Data Source	Reference year			Per capita (kg/yr)	2020 (projected)		2024 (projected)	
	Year	Generated (t/yr)			Generated (t/yr)		Generated (t/yr)	
		South Africa	Western Cape		South Africa	Western Cape	South Africa	Western Cape
ERA (2018)	2018	360 000	–	6,21	370 301	43 290	390 189	46 385
DEDAT (2016)	2015	–	62 251	9,83	585 953	68 501	617 424	73 399
EWASA (2016)	2015	322 000	–	5,81	346 353	40 491	364 955	43 385
Lydall et al. (2017)	2017	74 923	–	1,31	78 202	9 142	82 403	9 796
StEP (2013)	2012	339 310	–	6,41	382 047	44 664	402 566	47 857
UNU (2018)	2016	321 000	–	5,71	340 087	39 758	358 352	42 600

4.3.1. Market overview

E-waste generated

Estimating e-waste generation rates in SA is a challenge. Table 12 summarises the various reported tonnages for SA and the WC, with projected tonnages for 2020 based on population growth.

For the purpose of this MIR, the range has been determined from the tonnages as reported by the Western Cape-specific study by the WC's Department of Economic Development and Tourism (DED&T) (2016), and E-Waste Recycling Authority's (ERA) (2018)[41] estimated tonnages. Growth of e-waste generation is generally linked to population growth (and to some extent affluence).

The WC population is expected to grow by 7% between 2020 and 2024, and the Cape Town metropolitan area by 8% (Quantec, 2021b). By 2024, the WC is estimated to generate an additional 3 095 to 4 966 tonnes of e-waste per year. As the most populous municipality, Cape Town will also have the largest concentration of e-waste, which is expected to increase to between 2 235 and 3 795 tonnes by 2024.

Table 13 illustrates the provincial distribution of e-waste, estimated values , and the estimated tonnes per square kilometre.

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

Source: Using (Quantec, 2021a, Quantec 2021b) to project and infer (DEDAT, 2016) and (ERA, 2018)

Munic/Metro	2015 (DEDAT, 2016)	2020 (Projected)		2024 (Projected)
	Generated (t/yr)	Generated (t/yr)	Concentration (t/km²/yr)	
City of Cape Town	25 661 – 43 575	28 439 – 48 292	11,6 – 19,7	30 673 – 52 086
Cape Winelands	5 314 – 7 470	5 829 – 8 195	0,3 – 0,4	6 235 – 8 765
Central Karoo	454 – 623	462 – 633	0,0 – 0,0	465 – 637
Garden Route	3 666 – 4 980	3 839 – 5 214	0,2 – 0,2	3 956 – 5 374
Overberg	1 683 – 2 490	1 854 – 2 743	0,2 – 0,2	1 990 – 2 945
West Coast	2 608 – 3 113	2 868 – 3 423	0,1 – 0,1	3 066 – 3 660
Western Cape	**39 386 – 62 251**	**43 290 – 68 501**		**46 385 – 73 467**

[41] The EPR scheme for electrical and electronic equipment uses the ERA (2018) figures as its reference

E-waste landfilled: It is difficult to estimate the amount of e-waste generated within municipal boundaries, let alone estimate the impact that COVID-19 has had on consumption and waste generation. However, it is somewhat easier to estimate the amount of waste disposed of at landfill.

Figure 30 illustrates the estimated amount of waste going to Cape Town's landfills (municipal and private). Using the CCT's 2018 waste characterisation study (CCT,2018a), it is possible to estimate the amount of e-waste landfilled.

A total of ~3 697 tonnes of e-waste (computers, phones, appliances, and some batteries and lighting) is estimated to have been landfilled in the CCT's landfills in 2020. Unfortunately, the waste characterisation for private landfill is not available and as such, an estimate of e-waste landfilled at private landfills is not possible.

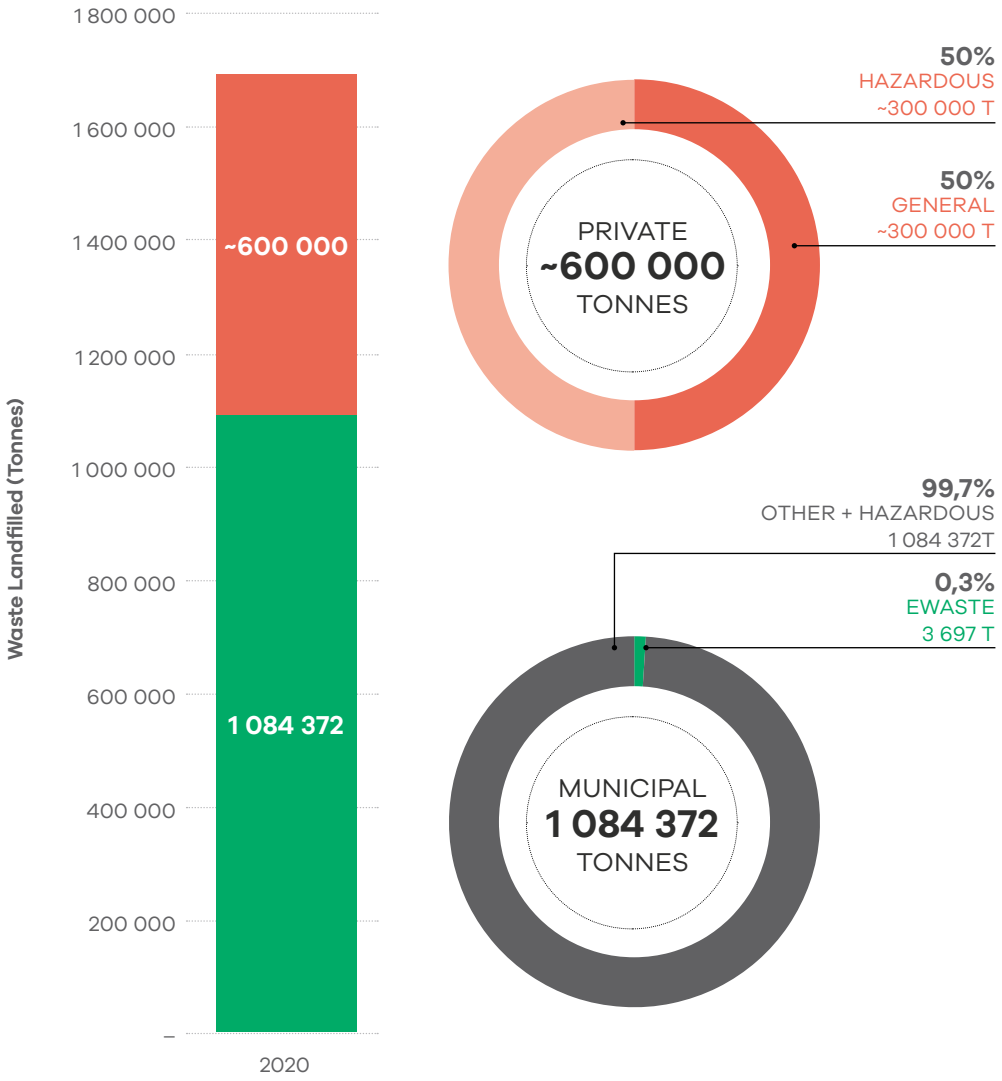

Figure 30: E-waste landfilled in Cape Town in 2020 relative to all waste landfilled

Source: CCT (2021d) and CCT (2018)

4.3.2. Opportunities

If a conservative range of between R1 283 (low-value CPU, printers, photocopiers) and R1 603 (high value for large white e-waste) per tonne of scrap e-waste is applied, then the low value of e-waste in the WC is between R55.2 and R109.8 million per year, with the Cape Town metropolitan area holding the largest value of between R36.5 and R77.4 million. However, based on actual landfilled numbers of ~3 697 tonnes at CCT landfills and ~1 026 tonnes potentially landfilled at the private landfill, this value of e-waste being landfilled is between R6.1 million and R7.6 million per year.

4.3.3. Drivers & enablers

National e-waste landfill ban

The national norms and standards for the assessment of waste-for-landfill disposal (R636 of 2013) provide a list of waste streams to be banned from landfill at certain dates (see **Figure 16**). This list required hazardous lighting lamps to be banned in August 2016, and as of August 2021, all hazardous e-waste, including batteries, have been banned.

These landfill restrictions should stimulate growth in alternative solutions to landfilling e-waste.

National Waste Management Strategy focus on e-waste

Through the NWMS, the DFFE has committed to facilitating the diversion of 40% of waste from landfills within five years; 55% within 10 years; and at least 70% within 15 years. To achieve this, the NWMS (see **Table 3** in **Section 3.2.1**) includes several key actions that are directly related to e-waste recycling. These actions will likely be included in Waste Economy Master Plan currently being drafted. These actions should facilitate supply and stimulate demand for e-waste recyclate.

Extended Producer Responsibility

The electrical and electronic equipment EPR (see **Section 3.2**) focuses attention on recovery, collection and mandatory take-back schemes for a wide range of equipment as listed.

The scheme seeks to increase collection and recycling rates by 30% year on year, with a collection and recycling target of 103 000 tonnes in the next five years. Amendments (**GN400 of 2021**) include a mandatory take-back requirement for batteries, electrical goods, electrical consumer goods, and electrical industrial goods.

The lighting EPR scheme (see **Section 3.2**) covers a wide range of lighting as listed and seeks to increase recovery and collection of such lighting products. Furthermore, the recent amendments (**GN400 of 2021**) also include a mandatory take-back requirement for lighting equipment producers.

EPR is expected to inject investment into education and awareness; growth of existing collectors, consolidators, liberators, pre-processers, and processors; and into the establishment of new ones. The EPR approach should also facilitate the development of local end-markets for liberated material. Lastly, the EPR approach will result in better data collection of both local and imported e-waste.

The EPR schemes will be administered by registered PROs, who will be responsible for the collection, management and disbursement of EPR levies paid by producers. These levies will be used to subsidise collection and recycling of e-waste. Investors / businesses should contact these PROs to understand how to leverage their support and EPR levies to secure feedstocks, de-risk investments, and increase competitiveness.

City of Cape Town Waste Sector Plan

In order for the CCT to meet its NWMS diversion targets and the Climate Change Action Plan, the CCT has included several actions and projects that would include expansion of e-waste recovery (**Section 2.3.6**). These include new waste drop-offs, establishment of four new MRFs, and expansion of its separation at source programme. These initiatives will result in the extraction of, amongst others, household e-waste streams.

Although it is not yet clear how, it is likely the City will outsource operations of these facilities to the private sector to then direct material to recyclers for processing. This should unlock private and MSW e-waste.

Industry Bodies: Several e-waste related associations have been established to provide support to their members and associated industries. Furthermore, several registered PROs have also been established to manage EPR schemes. New and existing e-waste solutions should consider leveraging this support, but at the same time joining as members to ensure effective representation. See Appendix D for contact details:

- The e-Waste Association of South Africa (**EWASA**) is an e-waste association that has also registered to be a PRO for the electronics sector.

- The E-waste Recycling Authority (**ERA**) is a registered PRO for the electronics sector.

- **LightcycleSA** is a registered PRO established to organise the collection and end-of-life management of lamps, associated lighting equipment, as well as electrical and electronic equipment in SA.

4.3.4. Risks & barriers

Lack of reliable data

There is still a lack of reliable data on the types, rates, and tonnages of e-waste generated in SA. E-waste data collection is in its infancy, and is largely based on assumptions and extrapolations. Only when the EPRs are implemented will a more effective system be available to ensure valid and updated numbers. Further to this, scrap-metal dealers often intercept e-waste derived materials, which can then be misreported. This makes it difficult to provide accurate e-waste numbers, as they are recorded as generic scrap metal.

Access to feedstock

SA 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.

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 hazardous 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 to SMEs) and could lead to time delays, depending on the EIA process (see **Section 3.1**).

Exclusive recovery 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 introducing EPR 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 that high value streams are extracted beforehand, leaving behind low value materials.

As indicated earlier, according to ERA (2018), SA 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.

DFFE view of transboundary e-waste movement

Concerns are expressed nationally that SA 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 SA's ability to access foreign e-waste to enable economies of scale.

4.4. Anticipated Municipal Tenders

To deliver the CCT's Waste Sector Plan and its IWMP targets (see **Section 2.3.6**), several initiatives will likely be outsourced in part or in full to the private sector via regulated procurement. Businesses looking to secure reliable short term (three – five year) income sources and feedstocks are advised to consider tendering for contracts.

Figure 31 provides a pipeline of tenders related to specifically material recovery for beneficiation. This pipeline can be used by private sector, including SMMEs, to inform future implementation and expansion plans.

Type	Asset / Initiative	Status	2020				2021				2022				2023				2024				2025				+
			Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
Sludge disposal / beneficiation	WWTW sludge beneficiation	Existing					SCMB 82/11/20																				
	Cape Flats BBF digestate beneficiation	Future																									
	Cape Farms BBF digestate beneficiation	Future																									
	Zandvliet BBF digestate	Future																									
Separation at Source	Northern Area	Existing	SCMB 18/09/19																								
	Hout Bay – Camps Bay	Existing	SCMB 51/06/19																								
	Helderberg Area	Existing	SCMB 29/06/19																								
	North-Eastern Area	Existing	SCMB 14/02/19																								
	Two Oceans Area	Existing	SCMB 66/07/19																								
	Sea Point Area	Existing	SCMB 55/06/19																								
Material Recovery Facility	Kraaifontein MRF	Existing	SCMB 14/02/19																								
	Athlone MRF	Future																									
	Bellville MRF	Future																									
	Coastal Park MRF	Future																									
	Helderberg MRF	Future																									
	Swartklip MRF	Future																									
Mechanical Biological Treatment	Athlone MBT	Future																									
	Bellville MBT	Future																									

Figure 31: Existing and potentially future waste beneficiation tenders for the CCT

Source: CCT awarded tenders, expected infrastructure, draft Waste Sector Plan and IWMP

Type	Asset / Initiative	Status	2020				2021				2022				2023				2024				2025				+
			Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
Drop-offs	Athlone	Existing	SCMB 58/07/18																								
	Bellville	Existing	SCMB 58/07/18																								
	Atlantis	Existing	SCMB 50/06/19																								
	Belhar	Existing	SCMB 50/06/19																								
	De Grendel	Existing	SCMB 50/06/19																								
	Delft	Existing	SCMB 50/06/19																								
	Gordon's Bay	Existing	SCMB 50/06/19																								
	Hout Bay	Existing	SCMB 50/06/19																								
	Induland	Existing	SCMB 50/06/19																								
	Kensington	Existing	SCMB 50/06/19																								
	Killarney	Existing	SCMB 50/06/19																								
	Kommetjie	Existing	SCMB 50/06/19																								
	Mitchells Plain 1	Existing	SCMB 50/06/19																								
	Ravensmead	Existing	SCMB 50/06/19																								
	Retreat	Existing	SCMB 50/06/19																								
	Schaapkraal	Existing	SCMB 50/06/19																								
	Sea Point	Existing	SCMB 50/06/19																								
	Simons Town	Existing	SCMB 50/06/19																								
	Tygerdal	Existing	SCMB 50/06/19																								
	Vissershok	Existing	SCMB 50/06/19																								
	Welgelegen	Existing	SCMB 50/06/19																								
	Woodstock	Existing	SCMB 50/06/19																								
	Wynberg	Existing	SCMB 50/06/19																								
	Prince George	Existing											Unknown														
	Parkwood	Existing											Unknown														

Figure 31 continued...

Source: CCT awarded tenders, expected infrastructure, draft Waste Sector Plan and IWMP

Type	Asset / Initiative	Status	2020				2021				2022				2023				2024				2025				+
			Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
Drop-offs	Bellville	Future																									
	Bothasig	Future																									
	Durbanville	Future																									
	Khayelitsha	Future																									
	Macassar	Future																									
	Mitchells Plain 2	Future																									
	Mitchells Plain 3	Future																									
	Simonstown	Future																									
	Westbank	Future																									
Other	Garden greens chipping	Existing						SCMB 76/05/21																			
	Animal carcass collection	Existing							SCMB 45/08/21																		

Figure 31 continued...

Source: CCT awarded tenders, expected infrastructure, draft Waste Sector Plan and IWMP

FUNDING AND INCENTIVES

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

South Africa ranks as one of the top 15 nations in the world in terms of driving the green growth agenda (ahead of Australia, Singapore, and Finland). This drive is on the back of a range of funding solutions and tax incentives available to green technology manufacturers and service companies, as well as those who use or procure such goods and services.

The South African Climate Finance Landscape looks at detailed project-level data, understanding in detail the source, disbursement, instrument and use. The insights can support public and private role-players with information to shape sectoral strategies and selected policies and improve coherence and coordination between public and private level spending in the sectors. The South African Climate Finance Landscape has tracked R62.2 billion in annual climate finance invested in SA. Find out more here.

5.1. General database web page

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

The Green Finance Desk (GFD) primarily acts as a facilitator in the financing of green projects and green business. The GFD works across all sector desks at GreenCape. For more support please visit https://www.greencape.co.za/content/sector/green-finance

ACCESS TO THE SOUTH AFRICAN CLIMATE FINANCE LANDSCAPE

5.1.1. Green Finance Database

In conjunction with the Western Government Department of Economic Development and Tourism, GreenCape maintains a database of funding sources and incentives that may be relevant to green economy investors. The database contains information on more than 150 funding opportunities, including an overview of the opportunity and relevant contact details and links. It is ideal for any entity seeking a broad range of funding solutions and financial incentives, with South African institutions being the main source of opportunities. The database is available to view and download online[42].

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 online[43]. These incentives cover local manufacturing, critical infrastructure grants, small enterprise development and a diverse set of sector specific incentives (i.e. Aquaculture Development and Enhancement Programme).

[42] https://www.green-cape.co.za/content/focusarea/green-finance-databases

[43] https://www.greencape.co.za/assets/Uploads/Government-Funding-and-Incentive-Booklet.pdf

5.1.3. Finfind database

Finfind[44] is an innovative online finance solution that brings together SMME 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.

Wesgro has partnered with Finfind to assist local companies seeking finance for their business. See more here: https://wesgro.finfind.co.za/quiz/disclaimer/wesgro

5.1.4. AlliedCrowds database

AlliedCrowds[45] 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.
- Businesses / organisations can also contact Allied Crowds to create a customised funding database. This resource is ideal for any entity seeking a broad range of financial solutions on a global scale.

Click the buttons below to access the relevant content

GREENCAPE'S GREEN FINANCE WEB-PAGE

GREEN FINANCE DATABASE

GOVERNMENT FUNDING AND INCENTIVE BOOKLET

FINFIND WEBSITE

ALLIED CROWDS WEBSITE

44 https://www.finfindeasy.co.za/

45 https://alliedcrowds.com/

THE WESTERN CAPE: AFRICA'S GREEN ECONOMY HUB

The Western Cape is a world-class investment destination.


©Bruce Sutherland

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 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:

Western Cape Department of Economic Development & Tourism: Driving the green economy policy landscape in the Province.
InvestSA One Stop Shop: Offers convenient investor support on permits, licensing and registrations - all under one roof.

City of Cape Town Enterprise and Investment: Creates an enabling environment to attract investment that generates economic growth and job creation in Cape Town
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 nonfinancial 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 SEZ?

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 whole of Africa, in particular the SADC region.

Atlantis is a great location and development ready. 94 hectares of zoned development-ready land is available for leasing to investors. Bulk infrastructure is in place and Atlantis has new public transport and shipping links, whilst boasting fibre connectivity too. 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 INFO, CLICK TO EMAIL THE ATLANTIS SEZ BUSINESS DEVELOPMENT EXECUTIVE

atlantis special economic zone cape town

CLICK TO VIEW THE ATLANTIS SEZ WEBSITE

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


©GreenCape


HITACHI

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.

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, circular economy and resources.

Benefits of becoming a GreenCape member

We currently have over 2 500 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.

CLICK HERE TO BECOME A GREENCAPE MEMBER

We have facilitated and supported ~R42bn of investments in renewable energy projects and manufacturing. From these investments, more than 19 000 jobs have been created.

Through our WISP (industrial symbiosis) programme, by connecting businesses with waste / under-used resources:

435 000 fossil GHG emissions saved (equivalent to the electrical usage of 117 840 households in SA);

Over R150 million in financial benefits (additional revenue, cost savings and private investments);

398 economy wide jobs.

APPENDICES


©GreenCape

Appendix A: Western Cape waste generation

In 2016, the WC's DEDAT appointed a team of specialists (Urban-Econ Development Economists, JPCE and EScience Associates) to investigate the status of the waste economy within the WC. This includes waste generated figures per district municipality / metropolitan city in 2015. A summary of the estimated waste generation per stream in the metro and at a district level is provided below.

Material	Western Cape	CCT	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
Agricultural	**2 365 784**	**66 885**	**304 734**	**917 734**	**540 887**	**34 531**	**501 013**
- 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
Commercial	**352 441**	**254 968**	**39 591**	**15 805**	**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

Material	Western Cape	CCT	Cape Winelands	West Coast	Overberg	Central Karoo	Eden
Industrial	**528 660**	**382 451**	**59 385**	**23 709**	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
Construction & Demolition	1 704 680	1 090 995	272 749	85 234	85 234	17 047	153 421
Other	375 385	247 248	49 489	23 544	15 905	4 334	34 865
- E-waste	62 251	43 575	7 470	3 113	2 490	623	4 980
- Tyres	18 111	12 678	2 173	906	724	181	1 449
- Dewatered wastewater sludge	295 023	190 995	39 846	19 525	12 691	3530	28 436
Total	**7 714 303**	**3 713 693**	**1 012 430**	**1 185 394**	**768 061**	**84 094**	**950 631**

Appendix B: City of Cape Town Waste Figures

In 2018, JG Afrika was appointed by the CCT to undertake a waste characterisation assessment of MSW at six of its waste aggregation sites over a given period and subsequently extrapolate this across all CCT facilities. A summary of the waste characterisation estimates is provided below.

Waste stream / material			Fraction
Dry recyclables	Paper		13,23%
	Cardboard		
	Glass		3,78%
	Plastics	Soft	7,16%
		Hard	7,13%
	Tetrapack		0,53%
	Multilayer		1,60%
	Metals		1,97%
E-Waste	Electronics		0,34%
	Batteries		0,001%
	Fluorescent bulbs		0,001%
Hazardous	Cleaning, toiletries		0,07%
	Nappies		6,75%

Waste stream / material			Fraction
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		7,37%
Textiles	Textile		6,38%
Other	Construction		1,68%
	Wood		1,25%
	Other		1,50%
	Residual		18,80%

The tables below provide expected waste numbers for waste handled by the CCT and its contractors. The waste characterisation for the general waste landfilled comes from a 2018 waste characterisation study undertaken by JG Afrika on behalf of the CCT. The total general waste landfilled was extrapolated against the waste characterisation study to provide estimate materials landfilled.

Please note, these statistics are for municipal waste only, and exclude the ~600 000 tonnes landfilled at Cape Town's only private landfill, of which there is no waste characterisation study available for public consumption.

				2016	2017	2018	2019	2020
General waste landfilled								
Recyclables	Paper		13,23%	150 357	156 597	144 105	161 560	143 013
	Cardboard							
	Glass		3,78%	42 936	44 718	41 151	46 135	40 839
	Plastics	Soft	7,16%	81 372	84 749	77 989	87 435	77 398
		Hard	7,13%	81 031	84 394	77 662	87 069	77 073
	Tetrapack		0,53%	6 023	6 273	5 773	6 472	5 729
	Multilayer		1,60%	18 184	18 938	17 428	19 539	17 296
	Metals		1,97%	22 389	23 318	21 458	24 057	21 295
E-Waste	Electronics		0,34%	3 864	4 024	3 703	4 152	3 675
	Batteries		0,001%	11	12	11	12	11
	Fluorescent bulbs		0,001%	11	12	11	12	11
Hazardous	Cleaning, toiletries		0,07%	796	829	762	855	757
	Nappies		6,75%	76 713	79 897	73 523	82 428	72 966

				2016	2017	2018	2019	2020
General Waste Landfilled								
Organics	Food Waste	Mixed	8,51%	96 715	100 729	92 694	103 921	91 991
		Liquids	0,44%	5 001	5 208	4 793	5 373	4 756
		Starches	0,56%	6 364	6 628	6 100	6 839	6 053
		Dairy	0,03%	341	355	327	366	324
		Fruit / Veg	4,45%	50 574	52 673	48 471	54 342	48 103
		Meat	0,53%	6 023	6 273	5 773	6 472	5 729
	Residual Organics		5,94%	67 507	70 309	64 700	72 537	64 210
	Garden		7,37%	83 759	87 235	80 276	90 000	79 668
Textiles			6,38%	72 508	75 517	69 493	77 910	68 966
Other	Construction		1,68%	19 093	19 885	18 299	20 516	18 160
	Wood		1,25%	14 206	14 796	13 615	15 265	13 512
	Other		1,50%	17 047	17 755	16 338	18 317	16 215
	Residual		18,80%	213 659	222 527	204 776	229 578	203 223
Total:				**1 136 485**	**1 183 652**	**1 089 232**	**1 221 161**	**1 080 973**

	2016	2017	2018	2019	2020
Special / Hazardous Waste					
Special / Hazardous	26 754	18 396	9 347	5 976	3 399
Total:	**26 754**	**18 396**	**9 347**	**5 976**	**3 399**
Stockpiled					
Builders Rubble (stockpiled)	1 348 247	1 138 195	887 574	334 243	235 089
Garden Greens (chipped)	11 401	8 971	5 619	13 146	9 468
Total:	**1 359 647**	**1 147 166**	**893 193**	**347 389**	**244 557**
Waste Minimization					
Organics	134 047	162 418	134 512	64 182	71 755
Recyclables	25 234	23 453	27 754	27 921	34 417
Builders Rubble	434 095	302 677	323 154	173 055	143 545
Total:	**593 376**	**488 549**	**485 420**	**265 158**	**249 717**

Appendix C: City of Cape Town Waste Sector Plan Deliverables

The CCT has identified 23 strategic deliverables to meet its vision and strategic intents as outlined in the draft Waste Sector Plan.

#	Short Description	Long Description
1	Adopt NWMS Targets	Adopt NWMS targets and through the development of a Waste Strategy implement aggressive waste minimisation / diversion to meet as follows: 1) 40% waste diverted from landfill by 2025; 2) 55% waste diverted from landfill by 2030; 3) >70% waste diverted from landfill by 2035. 4) Waste focus resilience as per legislation with integrated facilities that can accommodate the strategic approach which focuses on beneficiation, circular economy.
2	Development of infrastructure and regulatory amendments	Accelerate infrastructure development and regulatory amendments to fast-track diversion to achieve targets by: 1) Develop a funding strategy to fund diversion infrastructure and operating expenditure for waste minimisation and diversion from landfill by considering alternate funding sources to implement the legislative changes impacting the City's solid waste management service. 2) Developing a fully integrated activity-based costing in place to determine the true cost of a service or what the cost drivers of the services are. 3) Revisiting the funding and tariff model in collaboration with Corporate Finance to address the high levels of cross subsidisation among the various functions and across the municipality. 4) Creating a balance in capital expenditure based on strategic demand prioritisation.
3	Adopt Provincial organic waste landfill diversion targets	Adopt Provincial IWMP organic waste diversion targets of 50% diversion of organic waste from landfill by 2022 and 100% diversion of organic waste from landfill by 2027.
4	Leverage facilities to divert organic waste and packaging	Make use of both decentralised and centralised facilities (including drop-offs) to maximise diverted organics and packaging waste. Provide infrastructure for both separation at-source and end-of-stream interventions.
5	Material recovery facilities to process separation at source	Develop infrastructure (Material Recovery Facilities) for at source sorted waste streams. (Mini-MRF's at larger drop-offs or free standing MRF's).
6	Separation at source for organics, recyclables	Investigate and increase collection at source services (organic waste, packaging waste recyclables), through a combination of commercial contracts, business initiatives (EPR), entrepreneurs, waste pickers and SMME's.
7	Pay-as-you throw funding options	Investigate and introduce pay as you throw funding options for at source collection services.
8	Fortnightly recyclables collection	Introduce a transition of recyclables collection from weekly to fortnightly, to ensure efficiency and save costs.
9	Access to material red tape reduction	Allow unrestricted, but regulated access to certain waste streams though the amendment of SWM regulatory instruments and to reduce the high financial costs of the diversion of waste from landfills or to meet targets for Climate Chang).
10	Accelerate accreditation of waste service providers	Accelerate the accreditation of waste service providers to ensure the private sector is compelled to report waste diversion figures. SWM cannot reach the NWMS waste diversion targets without private sector diversion.

#	Short Description	Long Description
11	Incentives / disincentives in support of accreditation	Develop and implement incentives / disincentives in support of accreditation requirements and required reporting.
12	Develop Circular Economy Action Plan	Collaboration with City departments and external stakeholders develop and implement a Circular Economy Action Plan (cross cutting intervention in the City) and ensure aggressive communication and marketing campaigns to champion circular economy to effect behaviour change to achieve waste avoidance behaviour change in Cape Town.
13	Develop and implement a city Cleanliness Index	Develop and implement a city Cleanliness Index in collaboration with city Directorates.
14	Compliance	Ensuring compliance in a changing legislative context focused on waste minimisation and diversion from landfill.
15	Policy and rollout out for servicing backyarders	Finalise policy for servicing backyarders and accelerate the rollout of weekly refuse collection services to backyarders.
16	Home composter Rollout	Accelerated rollout of waste composters
17	Develop capacity, resources, technology and infrastructure	Develop SWM capacity, resources, technology and infrastructure to meet growth, the changing environment and legislative imperatives.
18	Problematic waste streams	Dealing with problematic waste types other than general waste and the banning of certain materials or substances from landfills.
19	Dealing with the impact of COVID-19	Dealing with the Impact of COVID-19: 1) on our operations and ability to render a service without interruptions; 2) the economic impact on the city and ability to pay rates and taxes; 3) short/medium term impact on budget availability.
20	Mitigate unlawful occupation of waste related facilities	Providing infrastructure to mitigate unlawful occupation of land: 1) Closed landfills and facilities; 2) Historical landfills (abandoned).
21	Finalise local and regional resource economy study	Finalising the local and regional Resource Economy study as a supplementary strategic document to the lately completed regionalisation study (to inform CCTof imminent service demand risks).
22	Regulatory alignment	To align the City's waste management services with National and Provincial legislation and implement the national waste management hierarchy.
23	Manage Greenhouse Gas Emissions	To manage greenhouse emissions from the City's waste management activities.

Appendix D: Key Contacts

Organisation	Focus of Support	Website
ARO	Waste reclaimers / pickers	www.facebook.com/africanreclaimers
CGCSA	Retail and manufacturers	www.cgcsa.co.za
Collect-a-Can	Metal can recycling	www.collectacan.co.za
COPCO	Compostable plastics	–
ERA	E-waste recycling	www.eranpc.co.za
EWASA	E-waste recycling	www.ewasa.org
FERTSA	Fertilizer / compost	www.fertasa.co.za
Fibre Circle	Paper / Cardboard	www.fibrecircle.co.za
IWMSA	Waste sector	www.iwmsa.co.za
LightCycleSA	Lighting waste recycling	www.lightcyclesa.org
MetPac	Metal packaging	www.metpacsa.org.za
ORASA	Organic waste recycling	www.orasa.org.za
Packaging SA	Packaging	www.packagingsa.co.za
Petco	PET beverage bottle recycling	www.petco.co.za
Plastics|SA	Plastic sector	www.plasticsinfo.co.za
Polyco	Polyolefin recycling	www.polyco.co.za
RecyclePaperZA	Paper / cardboard recycling	www.recyclepaper.co.za
Rose Foundation	Used motor oil	www.rosefoundation.org.za

Organisation	Focus of Support	Website
SABIA	Biogas	www.sabia.org.za
SAEWA	E-waste recycling	www.sa.ewastealliance.co.za
SA Plastics Pact	Plastics	www.saplasticspact.org.za
SAPRO	Plastic recyclers	www.plasticrecyclingsa.co.za
SAWPA	Waste reclaimers / pickers	www.facebook.com/SAWPAZA
SAVA	PVC recycling	www.savinyls.co.za
TGRC	Glass recycling	www.theglassrecyclingcompany.co.za
WT4E	Waste to energy	www.wt4e.com/

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