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CIRCULARITY IN PLASTICS IN SOUTH AFRICA

Collection, sorting and aggregation to enable a circular economy for plastic packaging in South Africa

A circular economy for plastics has projected net economic and job creation benefits in both developed and developing country settings. South Africa has good potential to realise the benefits in a circular economy for plastics, building on expertise in both the plastics production and recycling sectors. This series of 10 briefs provides the context of the plastics industry in South Africa and highlights opportunities in a circular economy: Part 9 of 10

Collection, sorting and aggregation of plastics at end of life is essential for enabling a circular economy for plastics. This brief describes the current status of plastics waste management in South Africa with the aim of identifying opportunities to improve collection, sorting and aggregation.

Current status of collection, sorting and aggregation of plastics in South Africa

The end-of-life section of the value chain (i.e., from the point of waste generation to the production of secondary raw material) is only a portion of the value chain for a circular economy. In South Africa, this end of life segment is often equated with the circular economy, albeit that it can be more accurately described as the "recycling economy".

The end-of-life section of the value chain is largely dependent on material entering the waste management system, through recovery and collection. At this point, the potential for circularity in materials is already 'coded in' through the activities of material selection, product design, use and the systems that delivered the material to the recycling plant.

Growth of the recycling economy in South Africa has been hampered by poor waste management and collection systems.

This includes:

- Inadequate measures to ensure that materials remain at the highest quality at the point of generation (households, business and industry) through separation at source;
- Limited investment in, and availability of, collection services from the point of generation; and
- Slow development of processing facilities and thus the capacity for processing materials recovered from the waste stream due to a lack of demand for recycled material, for some streams.

Although the overall collected-for-recycling rate of 34.5% determined in 2017[1] suggests a substantial increase when compared to the 10% diversion reported in the 2012 National Waste Information Baseline Report (Department of Environmental Affairs, 2012)[2], the growth has been sluggish, with increasing recycling of plastics in particular being challenging. Recovery of plastics for recycling still predominantly occurs at landfills or other mixed sources (64% of the plastics collected for recycling are collected from landfills (Plastics SA, 2021)). This contributes to a poor effective recycling rate – only two thirds of the collected plastics are eventually converted to recyclate.

Under South Africa's new mandatory Extended Producer Responsibility (EPR) system, EPR fees paid by producers must fund the collection, transport, storage and recycling of their products, and as such additional investment into the 'downstream' activities of collection, sorting, aggregation and recycling will be made, starting in 2022. Industry (the producers) are also required to work with municipalities to optimise the infrastructure and services required. Optimisation of the post-consumer value chain (including industry and commercial value chains) is therefore critical for increasing the diversion of materials (including plastics) from landfill. The post consumer (or recycling) value chain is illustrated in **Figure 1** below.

The key activities are:

- Sorting of material at the source of generation, and aggregation thereof;
- Transport to sorting facilities;
- Sorting and bulking of materials;
- Bulk transport to processing facilities;
- Recycling/reprocessing.

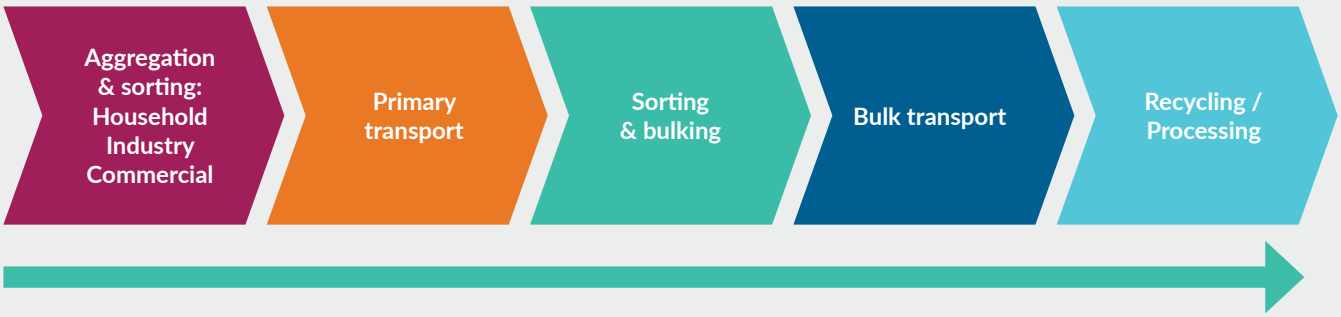

Figure 1: Post consumer recycling value chain

[1] Department of Environmental Affairs. (2018). *South Africa State of Waste.*

[2] Department of Environmental Affairs (2012). *National Waste Information Baseline Report.*

Recycling Value Chain

Sorting of material at the source of generation and aggregation

A key feature of successful recycling in developed countries is the maturity of the collection and aggregation systems, including separation at source programmes. Separation at source programmes have existed in South Africa for more than 10 years, although many of these have not progressed much further than "pilot" stages. Many of the metropolitan municipalities have some separation at source in place, but expanding coverage across the municipalities has been difficult to achieve. Thus the informal sector continues to be a vital contributor, although often unacknowledged, in making up for the deficiencies in the sorting and collection of materials at source.

Transport to sorting facilities (primary transport)

Municipalities face challenges regarding financing of waste vehicles, consequently, planning for, and implementing separate collection services for recyclables is very difficult for many municipalities.

To mitigate some of the costs and challenges associated with collecting materials separated at source, some municipalities have developed "hybrid" systems, where separation at source is encouraged, but the generators are responsible for transporting their recyclables (and other materials) to drop-off sites.

Additionally, SMMEs are also active in offering collection services to higher income residents for household recyclables, such that the more environmentally aware citizens who are willing to pay for collection, do have access to convenient collections.

Integration of the informal sector is required by EPR and an opportunity to increase access to recyclables from households. An example of a 'limited informal sector integration' model is where households place a separate bag of mixed recyclables next to their general waste bin for the informal sector to access materials, maximising the value of recovered materials and reducing losses due to contamination of plastics and other recyclables.

Sorting and bulking of materials

In order to minimise cost of transportation to recycling facilities, bulking up (compacting) of recyclables including plastics is an essential step. This often includes sorting of materials that have been diverted from the waste stream, followed by compaction. This occurs at both public (municipal) and private facilities – including material recovery facilities (MRFs), buyback centres and other facilities.

Some of the biggest hurdles to (plastic) recycling in South Africa are a lack of investment into the development of MRFs – due to financing challenges, through to operational inefficiencies and other challenges. Both private and public MRFs feature in South Africa. However, with limited implementation of separation-at-source across the country, as well as inefficiencies in these programmes, there are 'dirty' (public) MRFs operational where general waste is sorted to access low-quality, highly contaminated recyclables. In some municipalities, such 'dirty' MRFs are included as planned infrastructure and operations.

Price volatility has been cited as a challenge, leading to many MRFs continually changing/adjusting the waste streams they process. In addition, due to limited/lack of separation at source, at a national level the bulk of the material still comes from the informal sector (reclaimers), who typically salvage the material from mixed waste streams.

Recycling/reprocessing

According to the South African Plastic Recycling Survey, only 34% of recyclers processed post-'household' materials with the remainder processing cleaner post industrial/pre household consumer materials, and factory scrap. A major challenge is the high capital cost of wash plants to accommodate the dirty post-consumer material from landfill (Plastics SA, 2021)[3]. 64% of plastics for recycling are sourced from landfill. This may account for the 30% wastage rate from recyclers (i.e. 30% of materials that reach the recyclers ends up as waste, with 10% diverted at sorting and 20% from processing in recycling plants). The losses of material that occur before the recycling plant, such as at buyback centres, are not quantified.

Plastic recyclers have to contend with both upstream (supply) and downstream (demand) challenges. On the supply side, poor separation at source means that the quality of material reaching the recycling facility is often low. On the downstream side, the price for recyclate is linked to the crude oil price, resulting in fluctuations in the market that are sometimes detrimental to recycling. In addition, the perception that recyclate is of poor quality means converters can be reluctant to substitute virgin material with recyclate.

The role of government and the potential for public-private partnerships (PPPs)

Local government is mandated to manage waste. Historically the focus has been on collection and disposal of general waste only, but more recently the need to also focus on minimising and diverting waste from landfill (among other activities) is required by iterations of the National Waste Management Strategy (2011 and 2020). Hence much of South Africa's local waste management operations (and therefore recycling) is highly reliant on the activities of government, and may be adversely affected in cases where there is poor service delivery by the local government. Local government has thus been strongly involved in the transition from disposal to diversion from landfill with much of the focus being on:

- Primary aggregation and sorting (at the point of generation for both households, and businesses);
- Transport of waste;
- Secondary aggregation and sorting (transfer stations/MRFs).

The largest investments (or costs incurred) by local governments to date regarding diversion of material from landfill has been in transport of recyclable materials from households, and construction and management of sorting and bulking facilities.

Although public-private partnerships (PPPs) have been suggested as a solution to the capital requirement for public facilities to allow investment in infrastructure where municipalities do not have the capital for such aggregation, sorting, bulking and even pre-processing infrastructure, historically these have been difficult to implement effectively for waste management across South Africa.

[1] In this model, the informal sector is not paid for their services as a formal collector providing a service for the household would be. Informal collectors then only earn by selling the materials they collect.

Opportunities to improve waste management to enable circularity in plastic packaging

Opportunities	Value chain actor
Materials – the quality of material handled can be improved	
Separation at source to reduce contamination	Waste generators, collectors, municipalities, PROs,
Improved wash plant capabilities at recyclers	PROs and producers, in partnership with recyclers
Systems	
Retrofitting or designing new collection and sorting systems to access materials that are currently not well recovered for recycling	Funded and driven by PROs and producers
End markets – improving the value of end-of-life materials	
Creating demand for secondary materials to be included in high-value products (therefore material will have a high value and will more likely be circulated multiple times through the economy)	Brand owners and retailers to specify recycled content, PROs and producers to develop end markets
This will have a knock-on effect of drawing more material into the system, incentivising collection by increasing the value of the material to the collector	

This summary is an extract from the report "*Market assessment of circular plastics opportunities in packaging, construction, agriculture and the automotive industry*", which forms part of a series "*Circularity in the plastics value chain in South Africa – opportunities and barriers*". The reports in the series are:

- **Part 1:** The Plastics Landscape in South Africa – Mapping value chains and key players.
- **Part 2:** South African enabling environment for a circular economy for plastics – a scan of best practice and current local and international policies and legislation.
- **Part 3:** Market assessment of circular plastics opportunities in packaging, construction, agriculture and the automotive industry.
- **Part 4:** A focus on increasing recycled content in packaging through multi-layer conversion.
- **Part 5:** Advanced recycling technologies in South Africa – status quo and potential.
- **Part 6:** Alternatives to problematic plastic packaging in South Africa.
- **Part 7:** The current state of waste plastics management in South Africa.
- **Part 8:** Realising opportunities for a circular economy for plastics in South Africa: actions for the short, medium- and long-term.

The individual reports and a summary of the entire series can be accessed by contacting the GreenCape Circular Economy team via **circulareconomy@greencape.co.za**.

The series is a product of the staff of the World Bank in collaboration with a research and analysis team comprising of GreenCape, the African Circular Economy Network (ACEN) Foundation, the South African Plastics Recyclers' Organisation (SAPRO), WRAP, and WWF South Africa. Financing for this work comes from the **PROBLUE Trust Fund**.

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