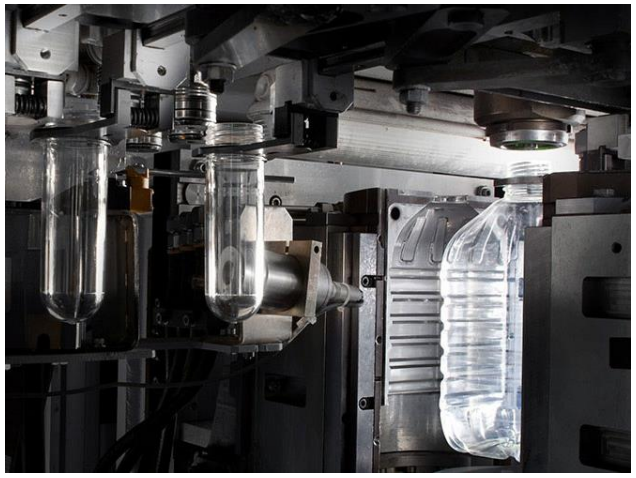

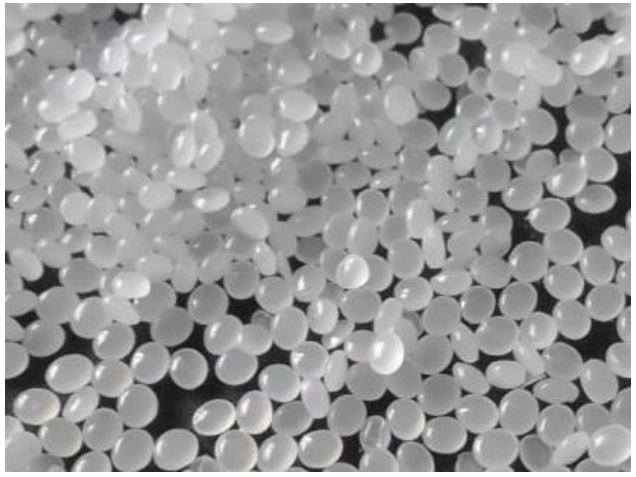

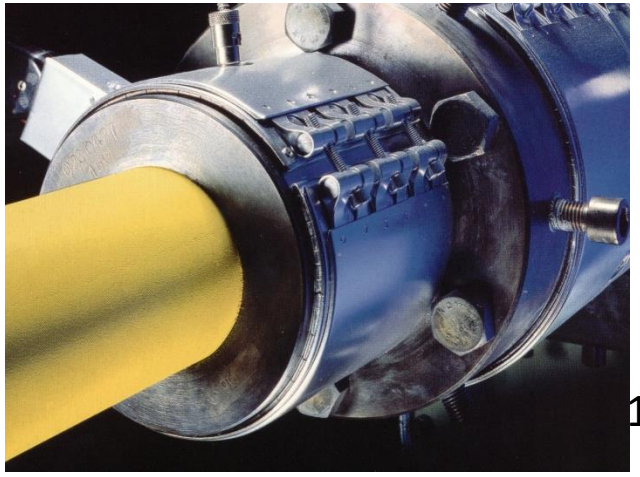

Plastics 2021

An analysis of the South African Plastics Industry data

Plastics|SA

Published in November 2022

About this Report

This report was prepared by Plastics SA and serves to present the South African plastics industry's activities during 2021. The information contained herein is based on sources, experimentation and methodology which, at the time of preparing this document was deemed reliable. This information is not to be used by a third party or extrapolated beyond its intended purpose, without the prior permission of Plastics SA. Plastics SA accepts no liability or responsibility whatsoever for any use of or reliance upon this report by any third party.

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Plastics – part of our lives

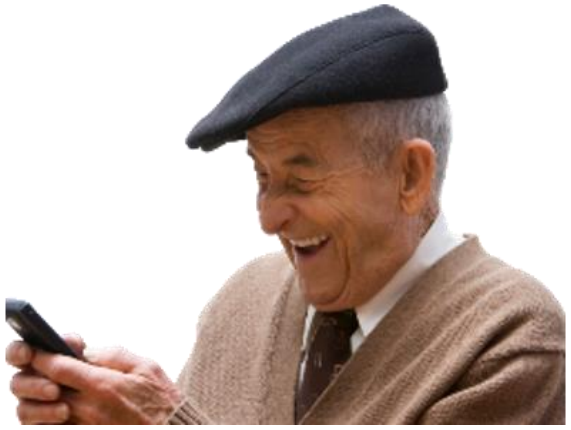
Plastics offer numerous benefits to society. They help feed the world in a safe and sustainable manner, they contribute to energy efficient buildings, allow great fuel savings in all transportation, and they can even save our lives. Plastics are key in innovation and in reducing energy demand whilst reducing greenhouse gas emissions. As an essential part of society, the plastics industry must ensure that plastics are sustainable and continue to have a positive impact on people and on the planet.

A lack of appropriate waste management infrastructure, policy incentives and business models means that the full value of plastics waste is currently not being captured. Plastics waste that is not disposed of correctly most often ends up in the environment, with unacceptable consequences. Plastics waste sent to landfill must be kept as a resource in the circular economy.

The plastics industry is striving to transform the traditional linear economy - where plastics are typically disposed of at the end of their service life - into a plastics circular economy. The plastics circular economy is a sustainable model where plastics remain in circulation longer, and are reused and recycled at the end of its life span.






Domestic Consumption

In 2021, South Africa converted **1 904 924 tons** of polymer into plastics products, an increase of 4.7 % from 2021; similar to the growth in the Gross Domestic Product (GDP) of 4.9 % for the same period.

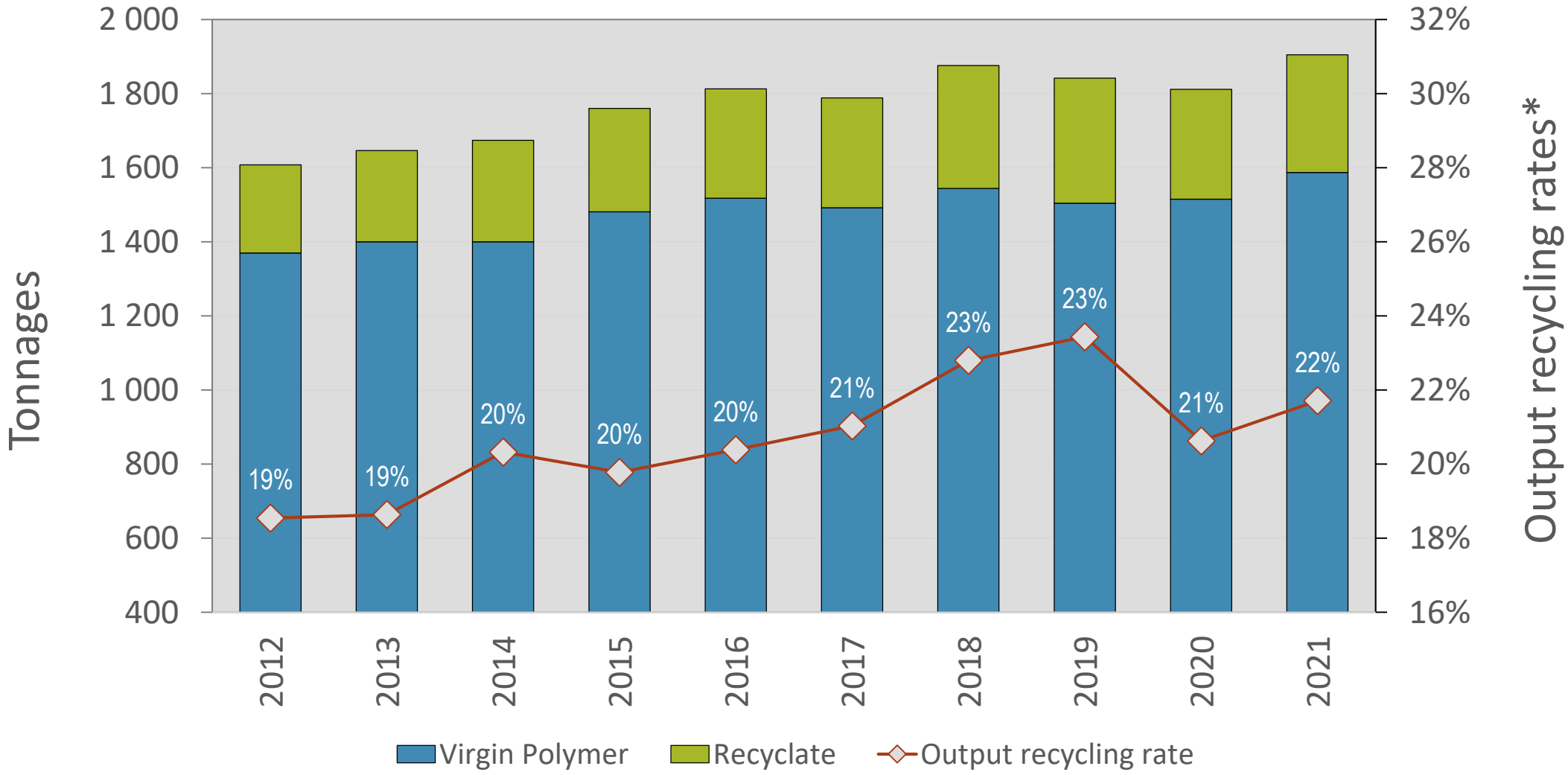
This is the total of locally produced polymers, nett imported polymers and recycled polymers sold to local convertors in South Africa, virgin and recycled. Locally recycled polymer made up **21.7 %** of the virgin consumption, an increase from 20.6 % in the previous year.

Polymer consumption data is calculated from locally produced virgin tonnages and the information obtained from the South African Revenue Services (SARS) for imported and exported polymers. Recycled polymer consumption data is obtained from sales of recyclate from the plastics recyclers into the local market. Domestic polymer consumption is only based on polymers locally converted into plastics products and semi-finished products.

Strengthening the competition in the South African plastics industry can have a significant impact on the recovery of the manufacturing sector in general. The plastics industry is essential to the supply chains of a wide range of strategic areas of the economy, including healthcare, energy generation, agriculture, infrastructure, aerospace, automotive, maritime, construction, electronics and packaging. Indeed, the benefits that plastics bring to other sectors is one of the remarkable features of the plastics industry.

The direct contribution to GDP amounts to 1.9 % and the contribution to the Manufacturing GDP 15.9 %. (Stats SA published amended figures for 2020 since the publication of PLASTICS 2020.) Very few plastics articles are used on their own - they usually form part of a larger, more valuable product. A plastics shoe sole does not have a value on its own, but stitched onto the bottom of a leather upper, it adds considerable value to footwear.

Domestic Consumption



** Output recycling rate = recyclate generated divided by virgin consumption*

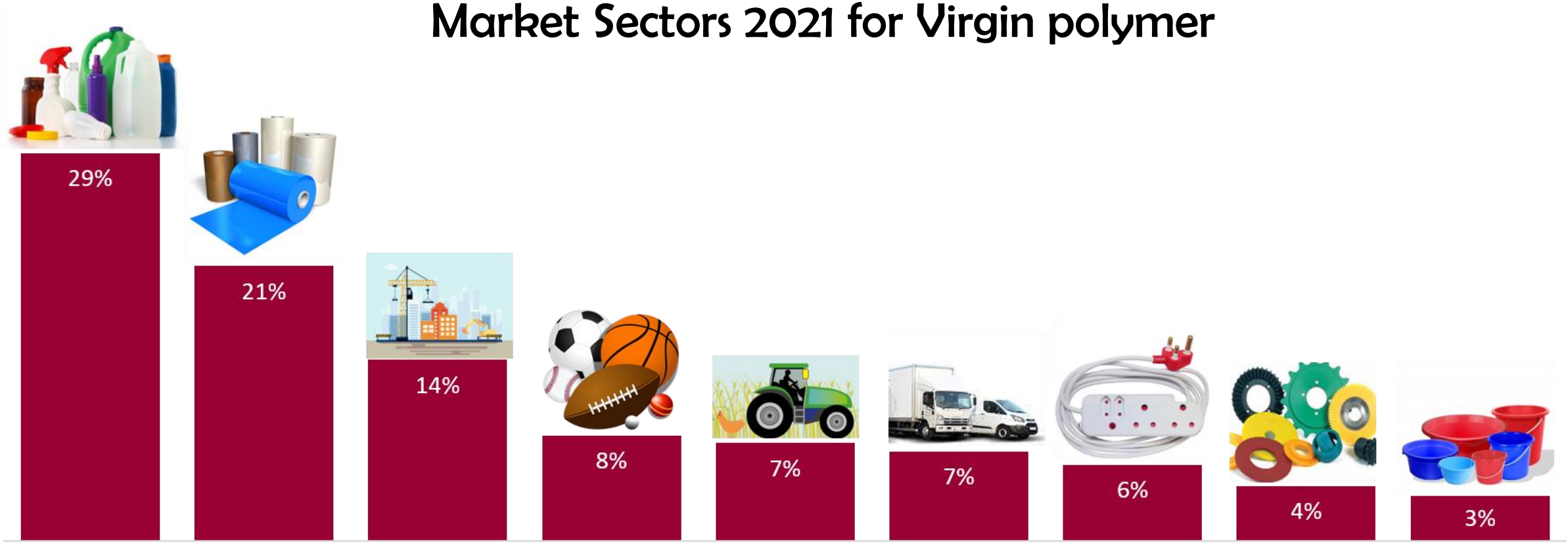
Market Sectors

Plastics convertors mainly manufacture packaging. Rigid packaging makes up 29 % of the local market and flexible packaging 21 %.

The Building and Construction sector represents 14 % of locally produced products. The demand for rotational moulded water tanks that peaked in 2019 and 2020, dropped off and Agriculture now represents 7 % of the domestic market, slightly less than the two previous years. Automotive and Transport applications also represent 7 % of the domestic market.

Both Mining and Engineering and Electric- and Electronic applications have gained one percent respectively in their individual market sectors. This is directly related to local sourcing by Original Equipment Manufacturers (OEM's) and brand owners. The poor exchange rate and the logistic challenges supported some local non-packaging related growth.

Market Sectors 2021 for Virgin polymer



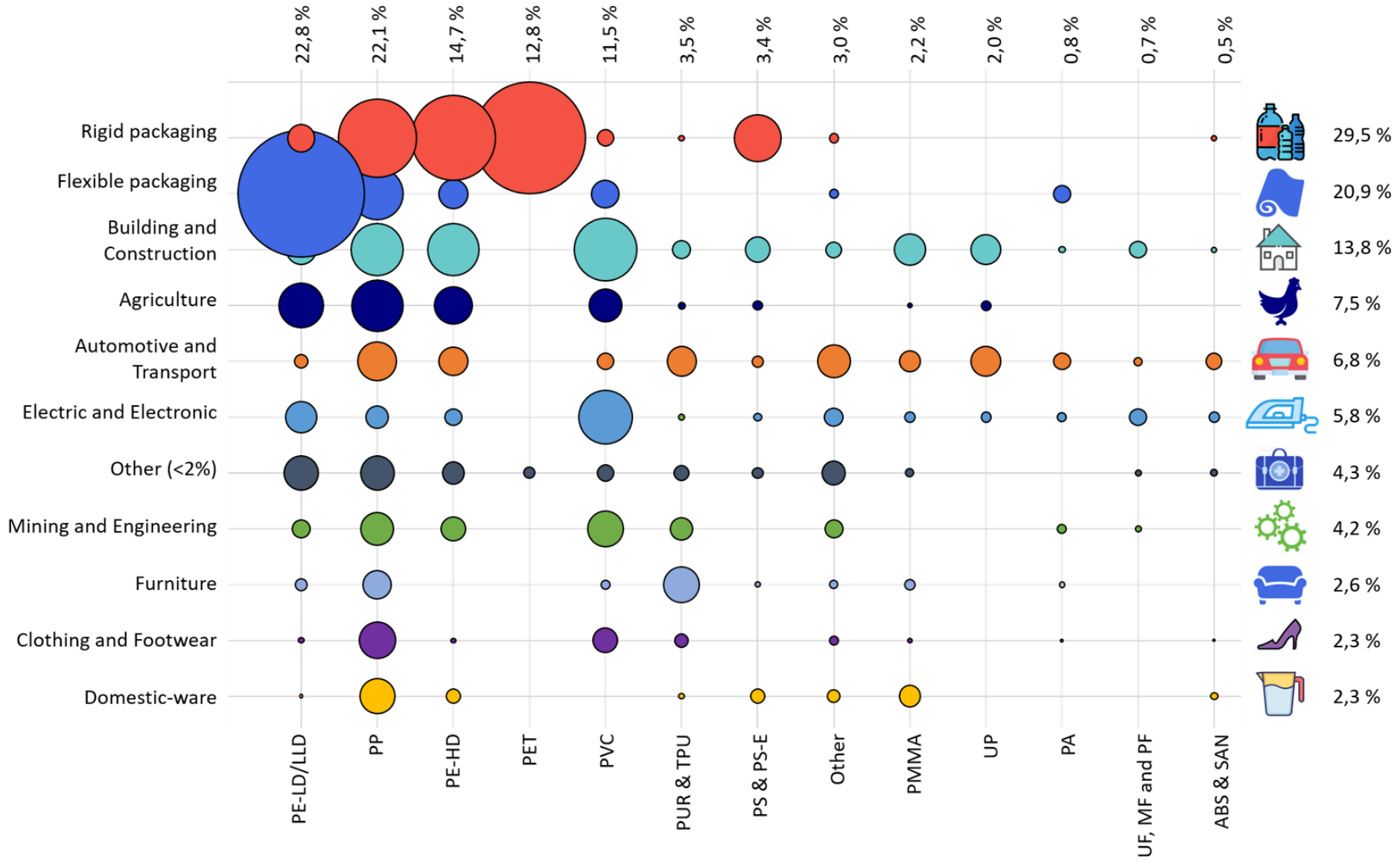
Plastic Materials

Commodity materials (Polyolefins, PVC, PET and PS) make up 87 % of the domestic virgin consumption. Most of the engineering polymers and specialty commodity grades not locally produced, were imported by agents and representatives as well as directly by convertors.

These materials are used across all market sectors in the **domestic market**.

Recycled materials (recyclate) are locally converted into plastic products. Some are good enough to complement virgin polymers and many others have unique markets that have developed over the years, suitable for the quality of available recyclate. In a circular economy, quality recyclate will replace (complement) many more virgin applications.

Virgin plastic demand by market sector and polymer in 2021



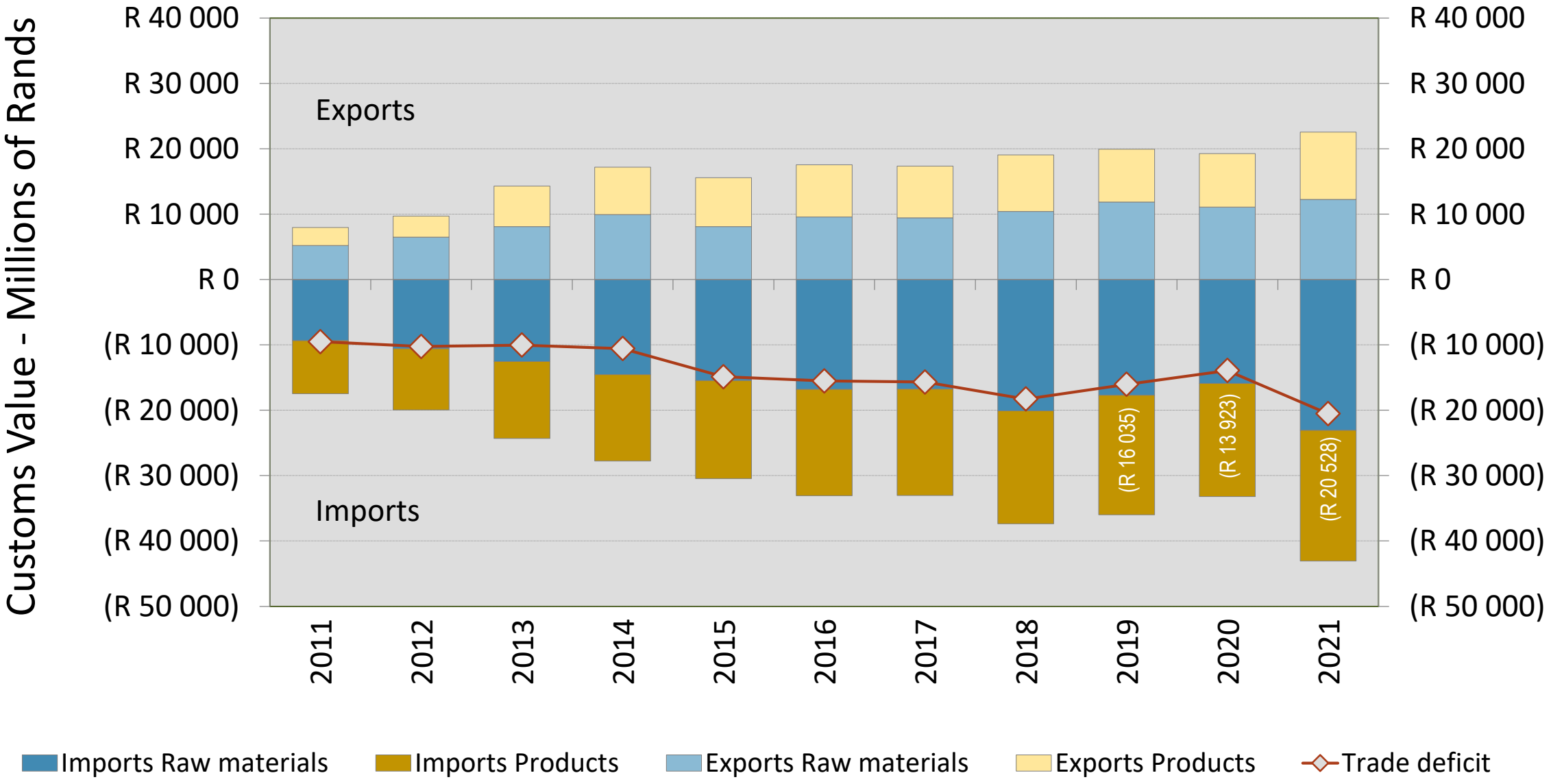
Trade Balance

A large volume of the total domestic consumption is produced from locally produced ethylene. The manufactured tonnages of PE-LD, PE-LLD and PE-HD are not meeting all of the local requirements. The manufacturing capacity of PP exceeds local demand and a substantial amount of PP is exported. However, South Africa imports polyolefin polymers where specific grades are not locally produced, where seasonal shortages are experienced and to have a second supplier account. Large quantities of finished and semi-finished plastics products are imported – also products made from the very same polymers that are exported.

Despite two large polymer producers in South Africa, the tonnages of polymer imported still exceed the exports, i.e. a trade deficit. In 2021, the total trade deficit was R20.5 billion whilst the total value of the domestic industry was estimated at R83.2 billion, resulting in a deficit of 25 %. The largest three contributors to the deficit in raw materials in 2021 were imports of PE-HD, PE-LLD and chemicals used to make polyurethane foams; combined contributing 45% to the total material trade deficit.

For finished and semi-finished products, the larger contributors were “Other Articles of Plastics and Articles: Other”, HS 39 26 90 90, PVC Flooring, other film/sheeting, other self-adhesive sheeting, PET, polyethylene, BOPP, and PVC Sheeting.

Trade deficit for HS 39 (Plastics and plastic products)



Extended Producer Responsibility (EPR)

The Government Gazette of 26 June 2020 (No 43481) stated the purpose of the EPR regulations as follows:

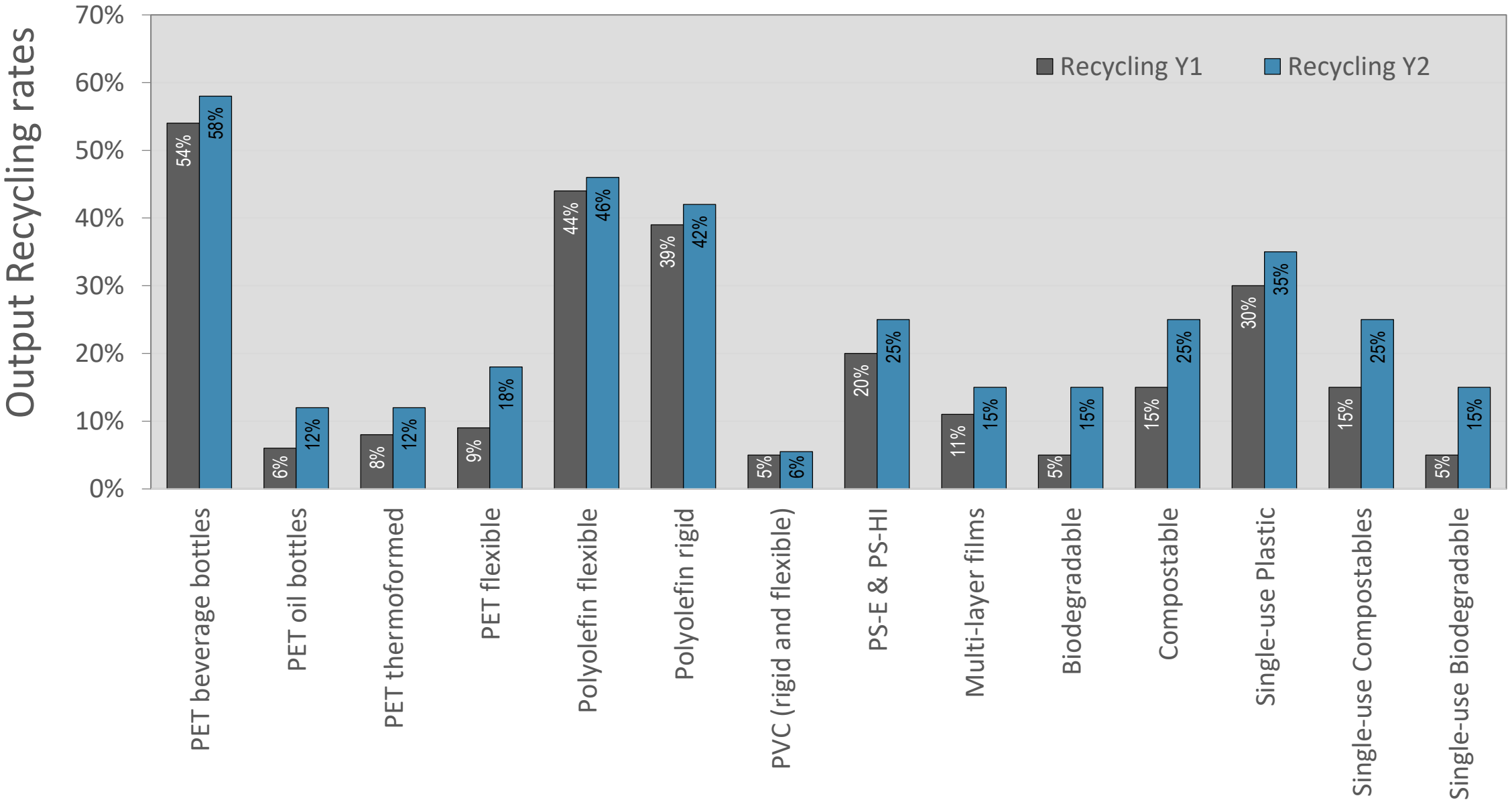
- to provide the framework for the development, implementation, monitoring and evaluation of extended producer responsibility schemes by producers, importers and brand owners in terms of section 18 of the Act;
- to ensure the effective and efficient management of the identified waste streams; and
- to encourage and enable the implementation of chemicals and waste economy and circular economy initiatives.

Plastics packaging is one of the abovementioned identified waste streams and includes all packaging formats of all plastics, including multi-layers, biodegradable and compostable packaging. It also covers single use products, e.g. flexible films, agricultural mulch films, garbage bags, pallet wrap as well as bottles, containers, jars, straws, sheets, punnets, cups, tubs, cutlery, etc. both in conventional materials as well as biodegradable and compostable materials.

Producers, local manufacturers, brand owners or importers, were required to register with the Department of Forestry, Fisheries and the Environment (DFFE) and establish and implement an extended producer responsibility scheme or join a suitable scheme by the 5th of November 2021. To date (9 Oct 2022) 884 Producers and 24 PRO's have registered with DFFE for the Paper and Packaging Sector.

The legislation comes with various responsibilities and auditing requirements with the ultimate objective of reducing waste in the environment and producers taking responsibility for products placed in the market. Each product and material type comes with measurable collection and recycling targets for the first five years.

Recycling Targets as per EPR legislation for 2022 and 2023



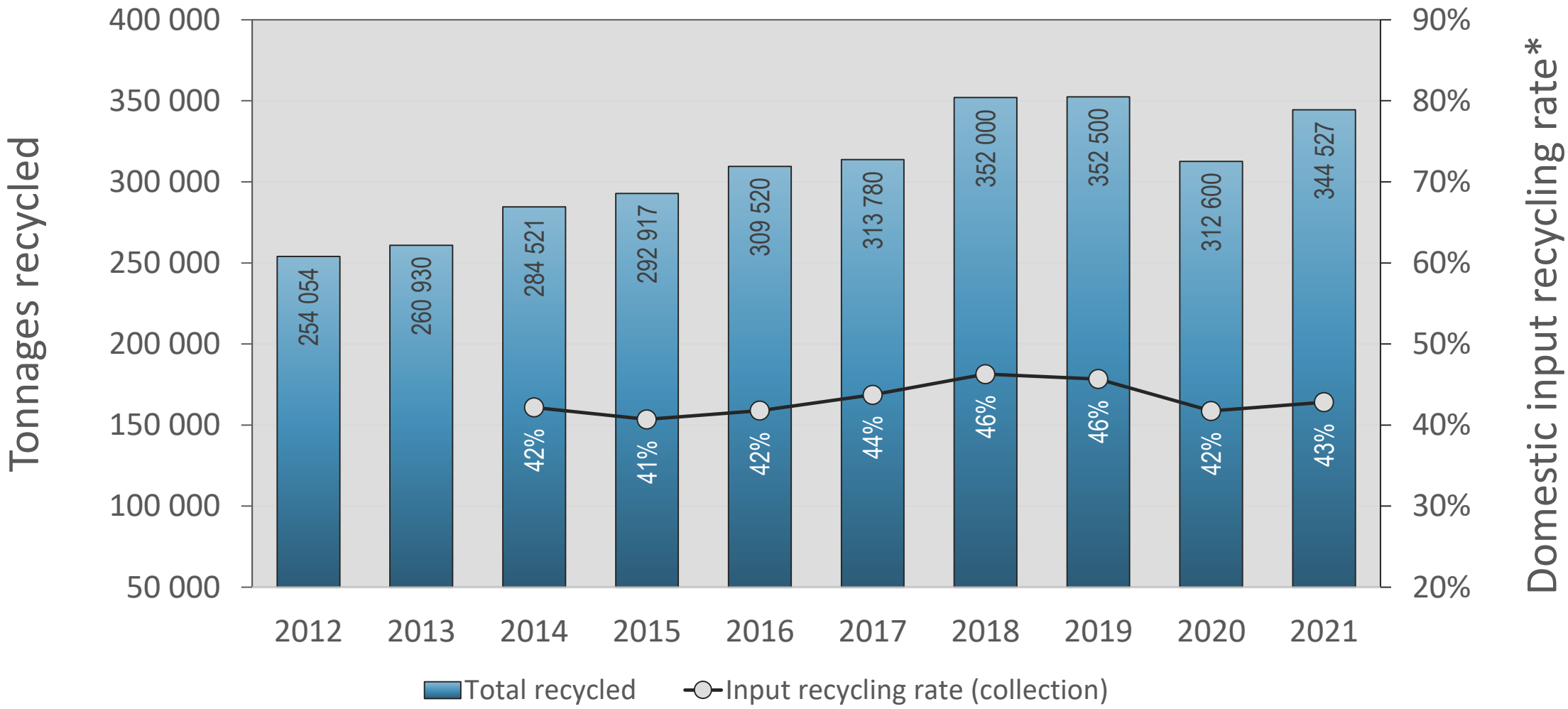
Plastics Recycling

For recycling to be effective, certain principles need to be in place:

1. Products need to be designed for recycling,
2. Systems need to be in place to collect recyclable waste from the solid waste stream as early as possible,
3. Specifications need to be in place for incoming recyclable waste,
4. Standards need to be developed and adhered to for the recycling processes and subsequent recyclate, and
5. Environmental claims need to be substantiated.

In 2021, South Africa recycled 344 527 tons of material into raw material, 10 % more than in 2020 in terms of tonnage turned into raw material. Recycling, especially the collection of recyclables, started to recover since the first year of Covid in 2020, but has not yet reached the levels of 2019. Recyclers, as with other manufacturing companies, suffered economic challenges, e.g. load shedding and the increasing cost of transport and energy. (Recycling consumes large amounts of energy, especially recycling material sourced from landfill. Recyclables also need to be transported to the reprocessing plants to ensure economic quantities.)

Tonnages recycled and input recycling rates



** Input recycling rate (Collection rate) = collected material divided by total recyclable waste in waste stream*

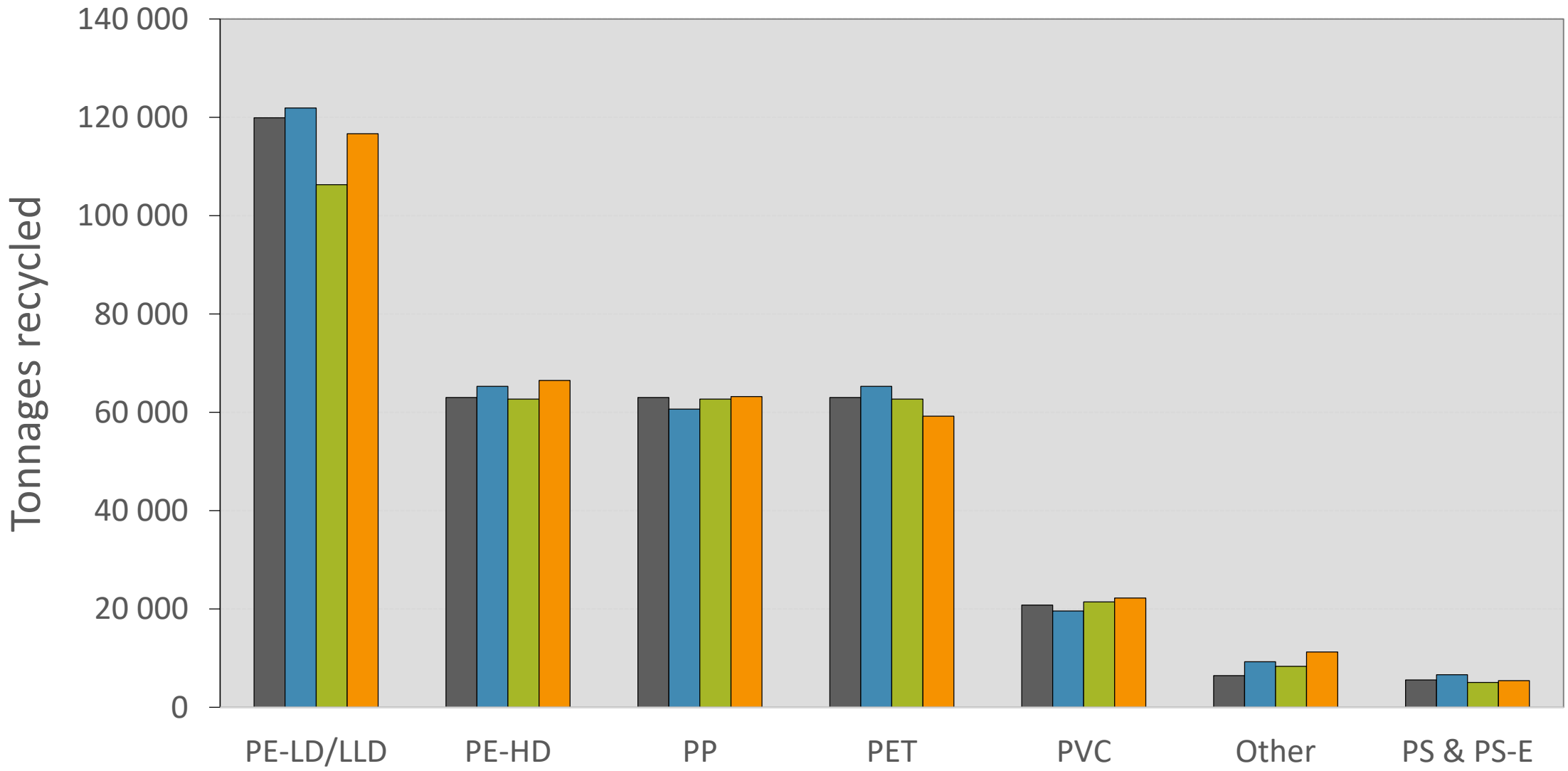
Recycled Materials

The most widely recycled material is **PE-LD/LLD** packaging films. The barrier to entry is relatively low with a well-developed collection system and existing end-markets in the Agricultural and Building and Construction industries.

The ever-increasing presence of compostable, biodegradable and oxo-degradable films in the incoming waste stream is putting pressure on this sector.

The less common materials are included in *Other.* An increased demand for recycled PMMA and ABS led to an overall increase in recycling rates for *Other*. Some of the initiatives focused on mixed and problematic recyclables have taken off and are processing increased volumes. As the demand for these products increases, the recycled tonnages should continue to grow. Initially many of these products are perceived as *novelties* and recyclers, who are in many cases also the producers, battle to grow into serious offtake agreements.

Plastics mechanically recycled in the last 4 years



Materials recycled into new raw material in 2021 in South Africa

	Rigid Packaging	Flexible Packaging	Packaging	Non-Packaging	Total 2021	Total 2020
PE-LD	411	102 203	102 614	14 071	116 685	106 327
PE-HD	44 699	2 281	46 980	19 504	66 484	62 715
PP	27 835	5 898	33 733	29 479	63 212	54 183
PET	59 240		59 240	3	59 243	54 556
PVC-P	100	360	460	13 741	14 201	13 440
PVC-U	564		564	7 478	8 041	7 993
Other	291	4 821	5 112	2 291	7 403	5 336
PS-E	2 449		2 449	394	2 843	2 546
PS	236		236	2 339	2 575	2 486
ABS	37		37	2 122	2 159	1 660
PMMA				956	956	607
PA				724	724	751
Total	135 862	115 563	251 425	93 101	344 527	312 600

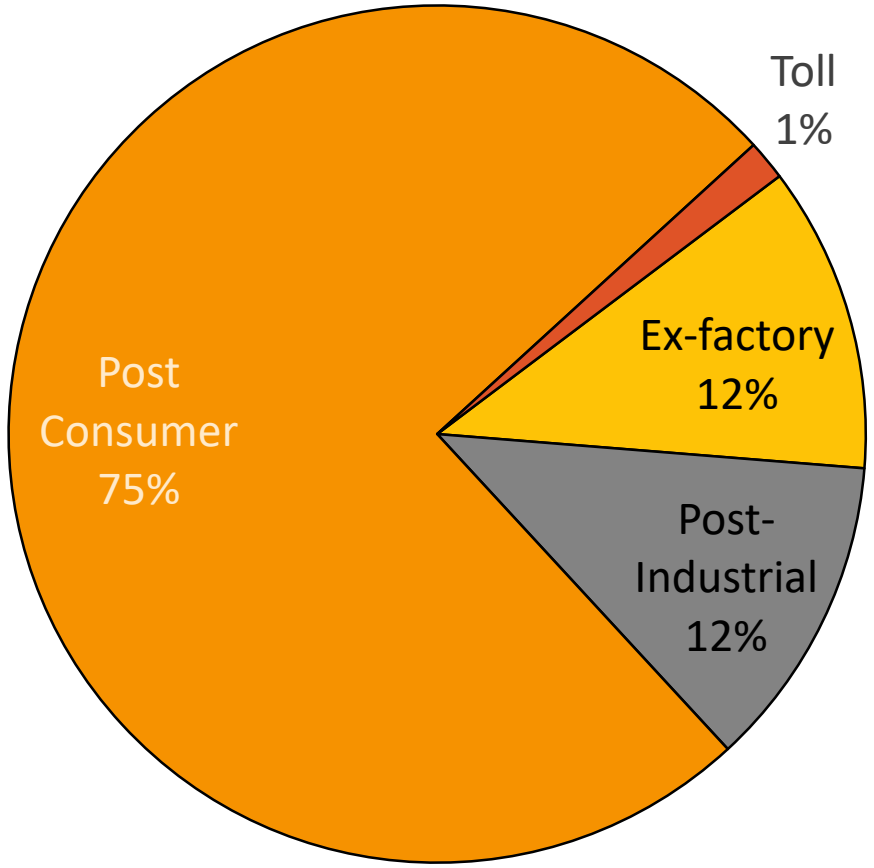
Collection and Sourcing of recyclable waste

Where do the plastics recyclers source their incoming materials? Recycling facilities deal with large quantities of one or two materials at most, on a daily basis. Different plastics cannot be mixed. Extrusion grade and injection grade should be separated as the recyclate is used for different conversion processes, i.e. different grades should not be mixed.

Sorting of incoming materials is labour intensive and increases processing costs. Recyclers do minimal sorting.

There are two aspects to the sourcing of incoming materials: where it was collected and who ultimately supplies the sorted, compacted material to the recycler.

In 2021, 75% of all incoming recyclables sold to the reprocessing plants were from post-consumer sources, including landfill harvesting, kerbside picking and buyback centres.



Employment in the Recycling industry

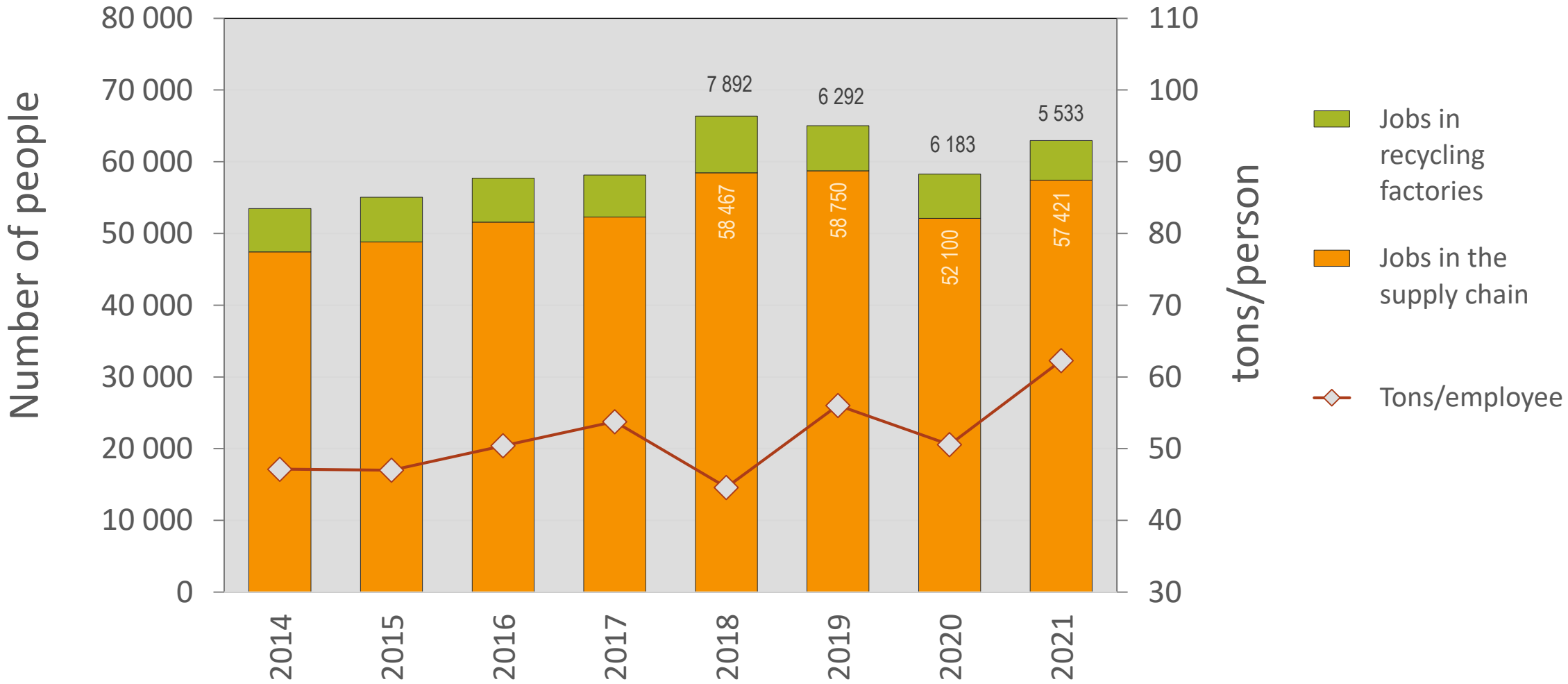
The formal employment in plastics recycling has decreased by 11 % to **5 533 formal jobs** since 2020.

23 % of the work force is female. Although females are preferred for sorting (more detailed), the physical nature of the bulk of the functions requires physically stronger male workers. A small number of contract workers (4 % of the total) are employed on demand for sorting incoming recyclable waste during busy periods. This number decreased once again as companies decreased the number of jobs and instead, bought sorted, cleaner waste to reduce operational costs.

Staff are paid monthly and payroll workers are paid hourly.

It is estimated that 57 400 informal jobs were sustained in the same period in the collection industry. These include waste pickers and employees of smaller entrepreneurial collectors. (The figures are based on 60 kg of plastics waste handled per person per day and 200 good collection days per annum. On average, two people handle recyclable waste before it is baled for transport to the recycler.)

Formal and informal jobs sustained through plastics recycling

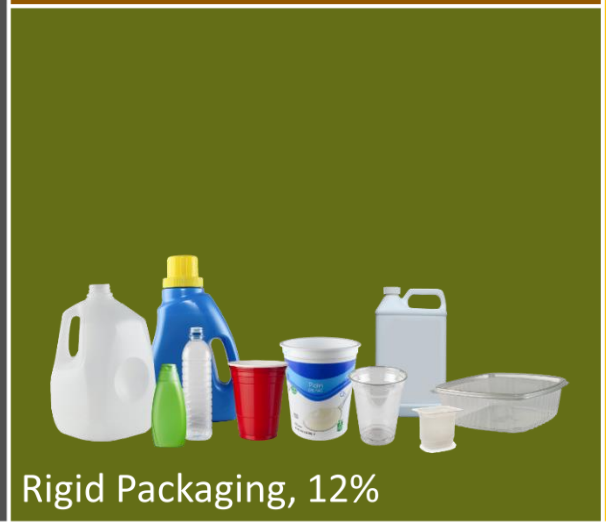


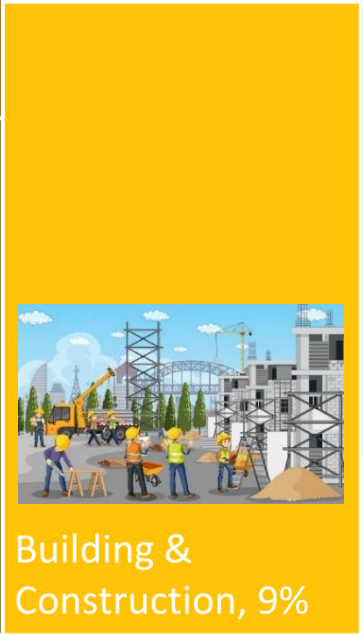
Recyclate Markets

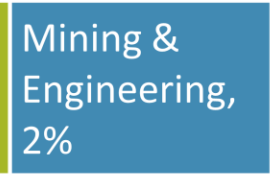
Successful recycling and increasing recycling rates depend on increasing market demand. End markets for recyclate were taken for granted as the demand for recyclate exceeded the supply of recyclable incoming materials for many decades. In the past 3 to 4 years, recyclers have had to work harder to find sustainable markets for their recyclate. Plastics converters are the recyclers' main clients and the manufacturing sector of the plastics industry was under major strain as the overall economic climate was depressed. The price of virgin dipped in 2018, improved slightly in 2019 and dipped again in 2020, followed then by massive price increases in 2021, overall resulting in unsteady recyclate demand.

However, more needs to be done to accelerate the overall circularity of plastics.

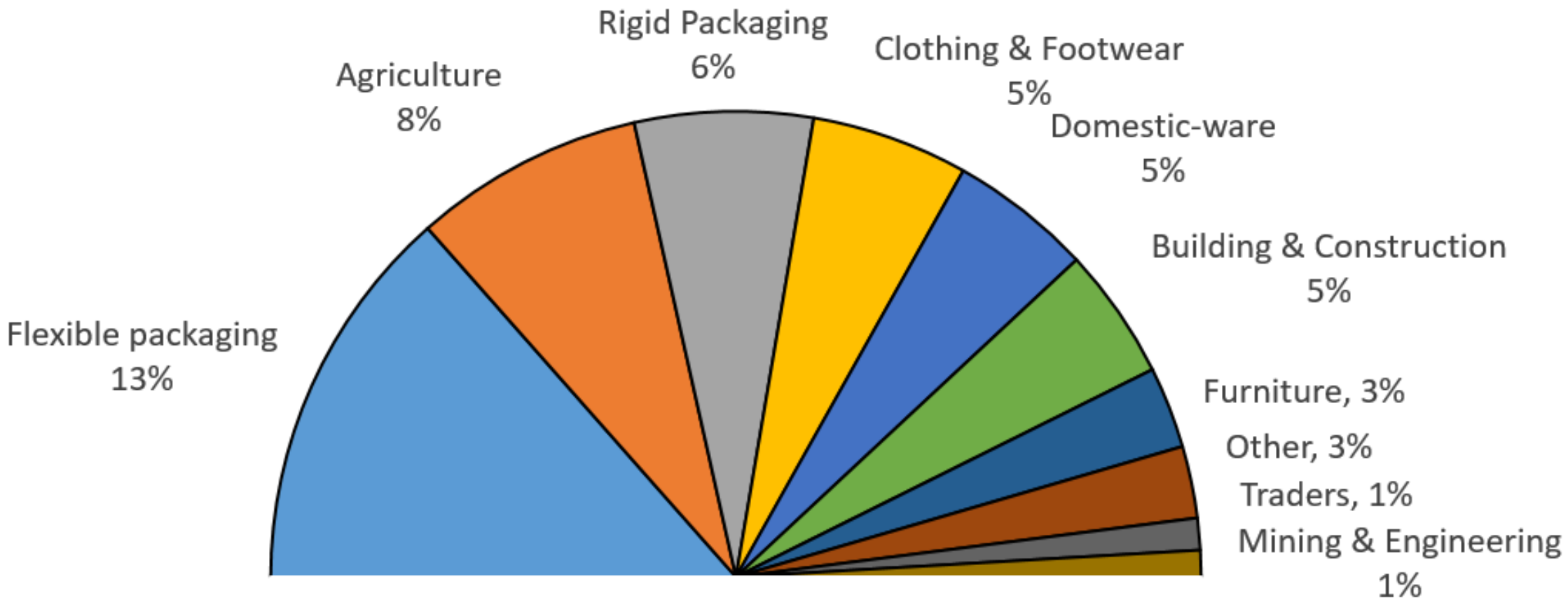
Recyclate Market Sectors in SA in 2021







Recyclate Market Sectors in SA in 2021



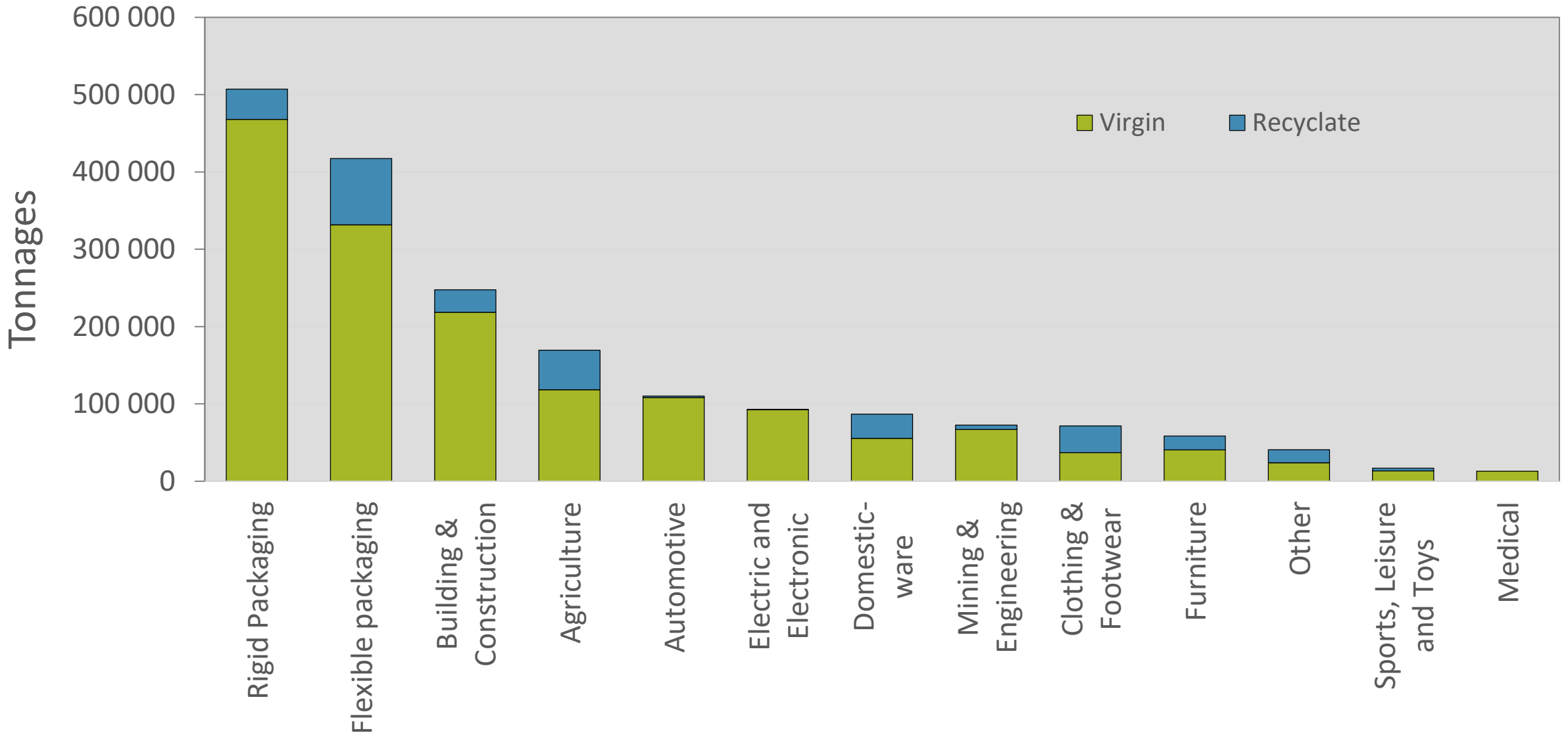
Recyclate Markets

Since 2012, the amount of recyclate produced in South Africa increased by 36 %. Consequently, the proportion of recycled content used in new products has increased from 14.8 % in 2012 to 16.7 % in 2021. Individual company pledges and initiatives like the SA Plastics Pact, industry initiatives, recycler actions, etcetera, are fostering the use of recycled plastics in different sectors.

Suitable end-markets are critical for the sustainability of the plastics recycling industry. Recyclate finds markets in almost all local market sectors. Only 7.7 % of the recyclate was exported as raw material to plastics convertors in Asia and in the SADC region.

South Africa developed markets over the years that are uniquely using recyclate and the products are all made from 100% recycled content. Examples are irrigation pipes, builders' films, refuse bags, planter pots, plastic chairs for functions, wash basins, and more and more carrier bags.

Market sectors for domestic industry



Circular Economy for Plastics

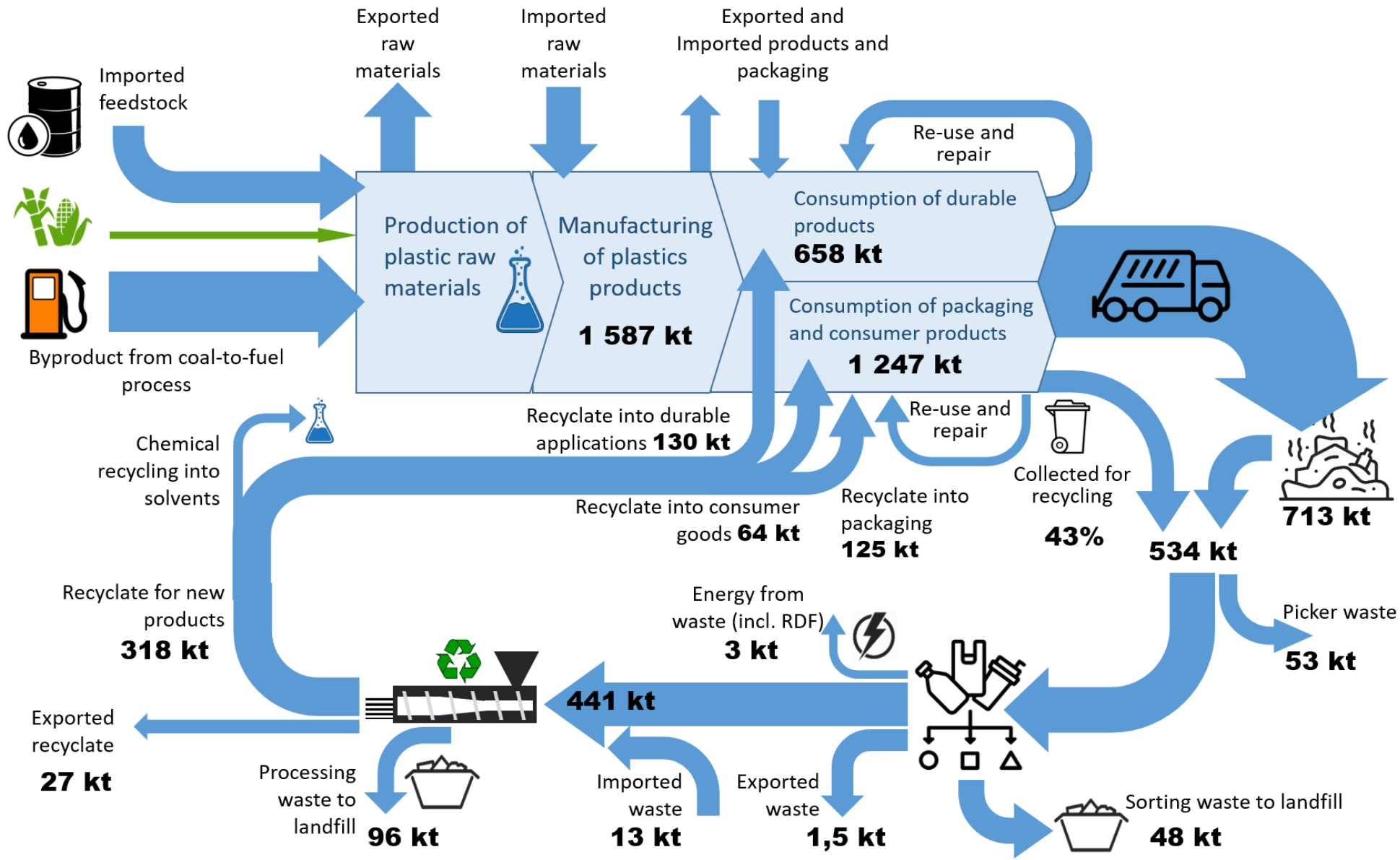
The circular economy is about recognising and capturing the value of plastics as a resource offering benefits to the economy, the environment and society in general. Transitioning to a circular economy is vital.

Although the circular economy is a highly effective concept for preventing plastics from ending up in landfill or polluting our oceans while we continue to enjoy their benefits, additional measures are also necessary. These include the prevention of any pellet loss from our operations (Operation Clean Sweep), ensuring the proper disposal of post-consumer plastics waste for increased collection and sorting as well as raising greater awareness within our industry and civil society (Plastics SA and PROs).

Whilst eliminating leakage and increasing the use of secondary materials is one part of the picture, the widespread adoption of renewable feedstock completes this picture. Since the aim of a circular economy is to keep materials in use for as long as possible, it must - by definition - require a new level of collaboration along the value chain.

The plastics value chain in South Africa is long and complex. Schematically it is represented as per illustration.

Circular Economy of plastics in South Africa – 2021 data



The Way Forward

Over the last century, plastics have offered innovative solutions to society's permanently evolving needs and challenges. Versatile, durable, and incredibly adaptable, plastics are a family of remarkable materials with science and innovation in their DNA. Nowadays, they allow us to meet a myriad of functional and aesthetic demands, from drinking clean water, playing sport, staying connected, enjoying the comfort of home and the efficiency of clean mobility, to helping us to live longer and healthier lives.

What we see on our beaches and along our pavements, is not the value that plastics add to our lives, but the mess we have made of the environment! The picture that we have of plastics is one of littered, dirty beaches and clogged up storm water systems.

The way forward is discussed in two sections, i.e. manufacturing and recycling.

Cradle to Grave

The Plastics Industry Master Plan states the vision for the plastics industry as:

Being a proactively adapted industry that is able to fully supply the growing, and forever changing needs of the local and export markets; an industry that is able to create jobs, advance transformation and economic inclusion; and sustainably industrialises in an environmentally responsible manner.

Five of the six pillars identified deal with growing and developing the local plastics industry.

- Value chain localization.
- Tailor-made industrial incentive packages
- Polypropylene Beneficiation
- Testing and Research and Development
- Trade Environment

Grave to Cradle

Recycling is one of the most important actions currently available to reduce the impact of this waste and represents one of the most dynamic areas in the plastics industry today. Recycling provides an opportunity to reduce petrochemical usage, carbon dioxide emissions and the quantity of waste which needs to be disposed of.

Plastics SA recommends a formal waste management value chain where a regular service exists for managing post-consumer waste (63 % of South African households). It allows for existing high-value recyclables to be picked whilst ensuring that the less-likely-to-be-picked portion is collected and consolidated in one place to facilitate the picking and beneficiation thereof. This will:

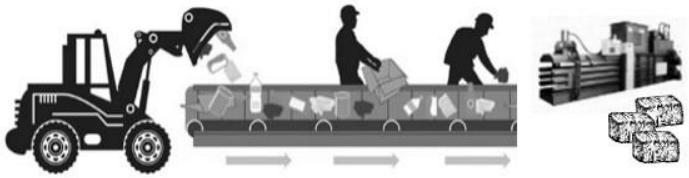
(a) increase recycling rates,

(b) incorporate waste pickers, and

(c) reduce waste in the environment.

Separated domestic waste

Recyclables taken to Sorting facility



Separation of recyclables into material types and Compacted for transport

Inter-link transporters

Plastics recyclers or re-processors

LOCAL GOVERNMENT

1. Separation at source - wet- and dry waste.
2. Local government collect wet waste – landfill or compost.
3. Sub-contractors to transport dry waste to waste beneficiation centre.
4. No informal picking to be allowed.
5. Home owners pay towards the service.
6. Municipalities have reduced waste management activity and subsequent savings.

COLLECTION AND TRANSPORT

PRIVATE SECTOR

1. Dry waste to waste beneficiation centre or MRF.
2. Centre is independent economic hub.
3. Waste pickers enlist with centre to sort for their own income.
4. All materials in one spot and accessible.
5. Private sector purchase sorted materials and beneficiate on site
6. Residual waste available for alternative recycling and further processing.

WASTE BENEFICIATION

PRO'S AND EPR SCHEMES

1. Private sector moves separated, beneficiated recyclables to recycling or recovery site.
2. PRO's establish end-markets and grow existing markets for recyclate.
3. PRO's manage and beneficiate residual compacted waste, i.e. pavers, building blocks, road surface, solid or liquid fuels, WtE, etc.

RECYCLING

Conclusions

Plastics is the better material in terms of its carbon footprint and remains the fit for purpose material of choice. Within the circular economy for plastics, the plastics industry will continue manufacturing plastics products but needs to ensure the best possible usage of resources (water, energy and raw materials). Recyclate is the secondary material resource readily available.

Above all, all stakeholders need to confront and address waste! It is clear that there is no silver bullet to solve the plastics pollution problem. We need to continue looking at the way we produce polymers, redesign products, develop reuse and refill models, find evidence based solutions and develop end markets. If we do not solve the collection of waste problem in South Africa all of the above will be ineffective with little impact on minimising plastics pollution!

Strong partnerships between an interconnected plastics value chain and all stakeholders - be they local, national or global - are needed to solve the waste problem and to develop innovative, sustainable solutions that will take this industry to a proactively adapted industry that is able to fully supply the growing and forever changing needs of the local and export markets.

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