

CIRCULARITY IN PLASTICS IN SOUTH AFRICA

Opportunities for a circular economy for construction plastics in South Africa

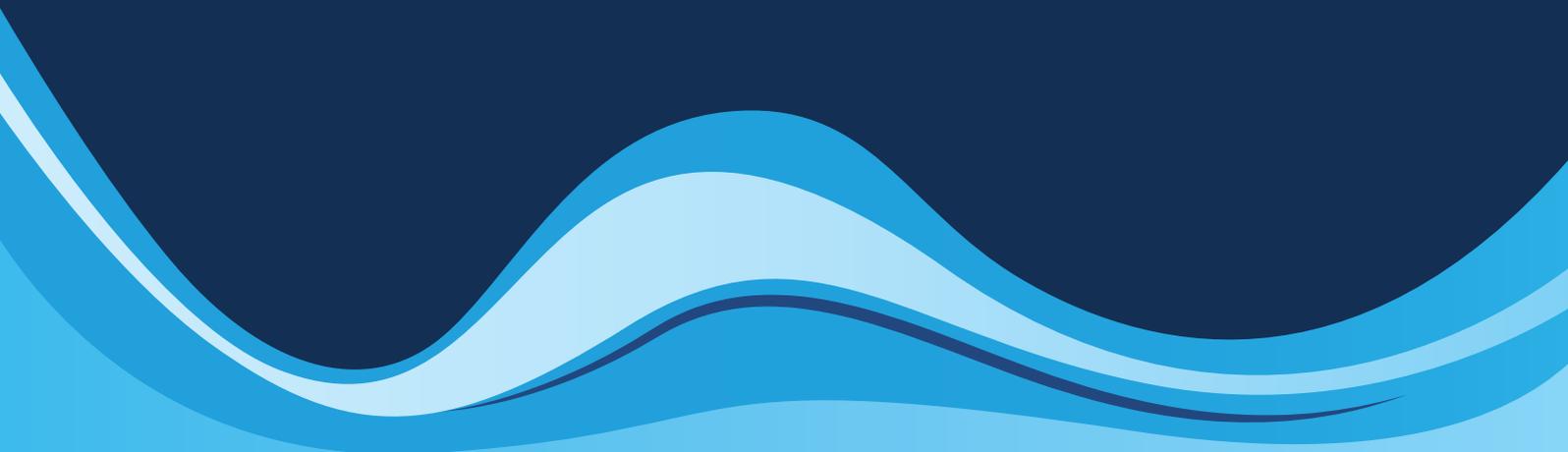


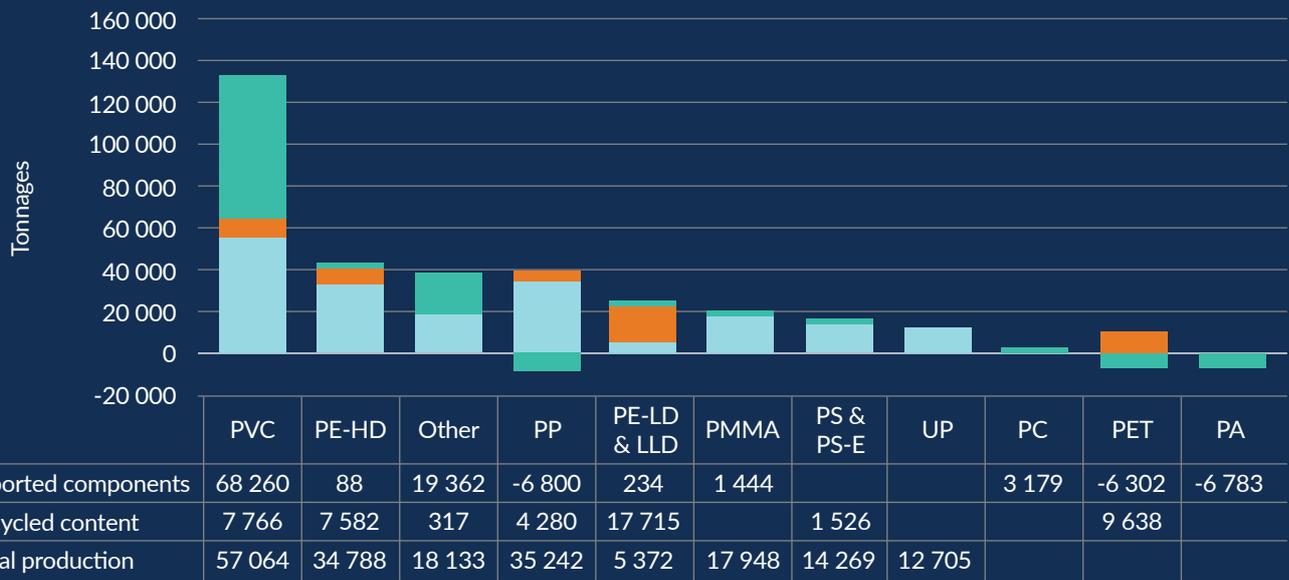
A circular economy for plastics has projected net economic and job creation benefits in both developed and developing country settings. South Africa has good potential to realise the benefits in a circular economy for plastics, building on expertise in both the plastics production and recycling sectors. This series of 10 briefs provides the context of the plastics industry in South Africa and highlights opportunities in a circular economy: Part 5 of 10

**Building and construction: The South African plastics market**

Plastics in construction represents a small percentage of the material demand of the sector. A survey of construction and demolition waste (C&DW) in South Africa reported the proportion of plastics in C&DW as 0 – 3.9%. However, deconstruction to recover materials before demolition is not widely practiced in South Africa, therefore plastics will be under-reported in the waste stream, more likely accounted for under mixed waste.

The tonnages of construction plastics imported and locally produced are presented in **Figure 1**. This includes data on the tonnages of recycled content by each polymer. PVC dominates the construction plastics placed on the market in South Africa, with HDPE and PP in distant second and third ranking. The largest recycled tonnages are included in LDPE and LLDPE products.

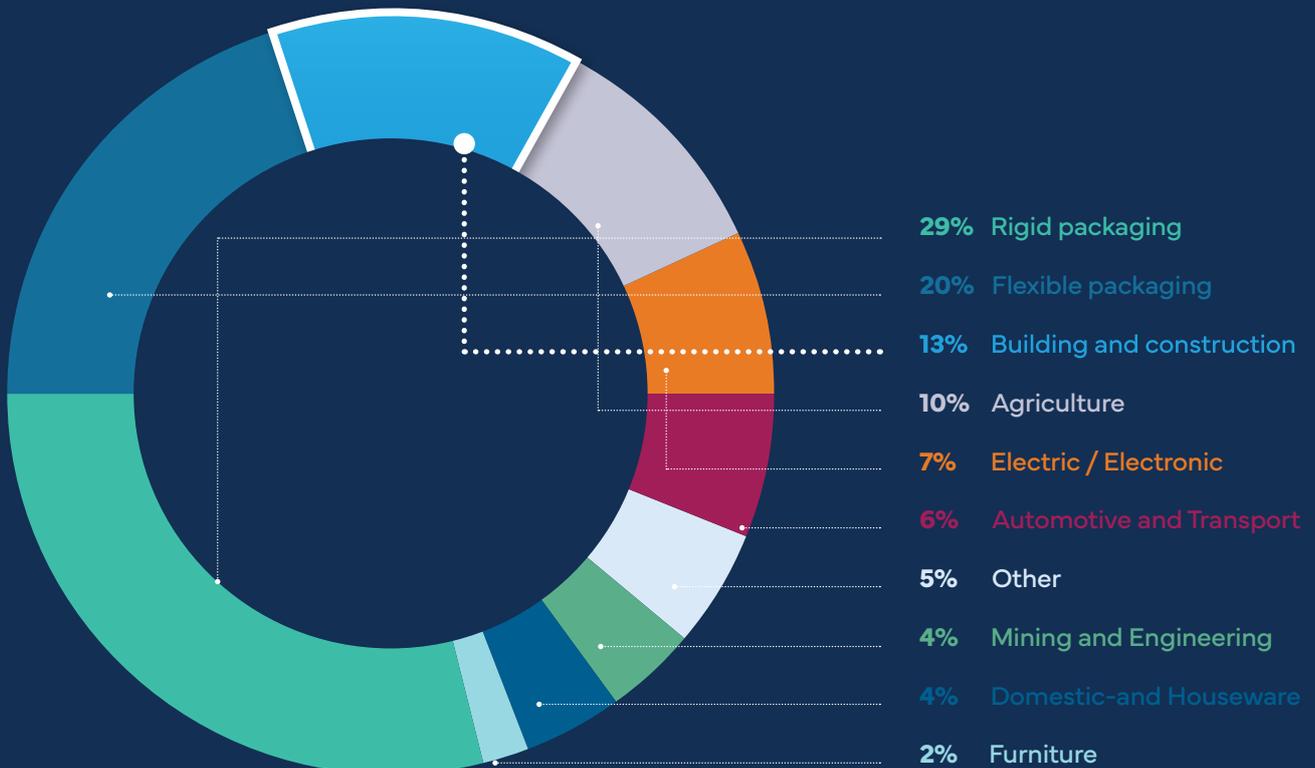




**Figure 1:** Construction plastics by polymer including trade balance on imported/exported products, and tonnages of locally produced virgin plastics and locally produced recycled plastics

Source: Pretorius (2021)

In terms of local conversion, the building and construction sector is the second largest market for plastics in South Africa, constituting 13% of locally converted polymer (**Figure 2**).



**Figure 2:** The proportion of polymer converted locally by market sectors<sup>1</sup>

Source: Pretorius (2021)<sup>1</sup>

### This brief:

- o Sets out the opportunities for circularity for construction plastics in the South African context in the short term, namely recovery, reuse, and recycling of plastics in construction; and
- o Discusses potential levers to drive greater circularity in the construction; sector in South Africa.

## Recovery and reuse of plastics in construction

Many of the construction plastics produced have limited potential for circularity through recycling, although some elements may be reused if recovered.

Construction plastics included in mixed material products such as ceiling panels, laminated flooring, shutters and blinds are difficult to recycle as elements need to be separated or may be inseparable. Other composite materials including plastic, like some composite bricks or tiles, may be recycled if returned to the same manufacturing process, however there are generally no systems in place for recovery, and therefore very limited recycling of such elements.

The most recyclable products are those elements that are manufactured from a single polymer such as guttering, pipes, and are sturdy, likely to endure years of use as well as survive deconstruction. However, plastics are rarely recovered for reuse and recycling from construction in South Africa. There are isolated examples of rubble crushing companies that have accepted mixed C&DW and which allow the local community to recover and remove plastic elements, predominantly piping. The end uses include use as piping if sufficiently long segments are available, or the making of sjamboks for sale.

Another potential avenue for recovery and reuse of plastic construction elements is the salvage industry catering to low income home builders, in both formal and informal areas. The most sought after elements are metals and wood for such stores, although plastic elements available are often carpet or carpet tiles, and some sanitary ware. Due to the low value of secondary building material, some construction companies allow their staff to remove these materials, and in some cases, even allow the public to collect secondary materials, however, wood and recovered bricks for use in low income home builds and not plastics are most commonly salvaged.

The reason for limited recovery of plastics apart from the low value, is that deconstruction is time-consuming and therefore costly, and space can be very limited on construction sites to store recovered materials. Unless the client is aiming at Green Building certification and specifically targeting the waste credits, there is very limited incentive to recover construction plastics. In addition, on construction sites, the main contractor generally requires that sub-contractors remove their wastes, therefore any wastage of plumbing, plastic sheeting, ducting and electrical plastics are generally not managed on site as a cost for the main contractor, but removed by each sub-contractor, making it unlikely that plastics are recycled.

## Recovery and recycling of plastics in construction

The limited formal recovery and recycling of construction plastics into the construction sector that does take place are for piping (primarily irrigation piping from the agricultural industry), production of road signs, air brick covers, plastic plaster floats and guttering (primarily from recovered ABS<sup>2</sup> and PVC). PMMA<sup>3</sup> recycling has also been documented.

Other products such as plastic wood are produced by a number of companies to a market size of about 4 400 tonnes per annum. The product is manufactured from a mix of polymers, such as mixed PP labels and PE-HD closures from PET recycling plants, or metalised BOPP and other snack packaging. The products generally do not have a system in place for recovery at end-of-life, and are also low value at end-of-life, and therefore unlikely to be part of a circular economy. Plastic wood in playgrounds and used as walk ways and benches also visibly degrade with slivers of material falling off the material. Such applications are thus not considered to be circular.

<sup>2</sup> Pipe fittings can be made from ABS, although ABS recycled into construction products is more likely sourced from the e-waste sector.

<sup>3</sup> Used as a shatter-resistant glass substitute and to make bath tubs.

## Potential levers to drive circularity in construction plastics

**Preferential or green procurement:** South Africa has a Preferential Procurement Policy Framework Act (2000) and an associated Preferential Procurement Regulations (2017) which focuses on local content, and allows a process to be instituted by the Department of Trade, Industry, and Competition (dtic) to designate thresholds (up to 100%) of local content in specified products for public procurement. A potential avenue to support circularity in construction is thus by the specifying of recyclable materials and local recycled content as an add-on to the current local content requirements for certain construction elements (mainly steel, and more recently cement in October 2021). There is potential to use the same mechanism to designate local recycled content in plastics used in the construction industry and other sectors.

There is also the potential for other government departments to use green procurement initiatives to include such local content and recycled content specifications in products and construction, as long as the specifications do not contradict the designated local content specified under the Preferential Procurement Regulations.

Construction industry stakeholders communicated that the local content requirements in construction are burdensome in terms of the administration and reporting, and it is often difficult to source sufficient information on local content at the tender stage. In order to address these barriers to inclusion of local and recycled content, recommendations from industry experts include:

- o Database of construction products and materials that include local and recycled content for ease of specifying at the tender and design stages
- o Certifications of local and recycled content
- o Simple local and recycled content calculators that can be directly linked to the Bill of Quantities
- o Local and recycled content targets by building/construction type.

**Modular construction** is another possible vehicle for circularity where building elements are manufactured offsite and include ducting, piping and other plastic elements embedded in the design. At end of life of the first use of the elements, the 'modules' can be removed and reassembled in a different configuration for the next application. However, modular construction in South Africa has a limited market, in part due to the lack of highly skilled labour required for such manufacturing.

This highlights the need for a concurrent focus on skills development to enable greater circularity for construction plastics in South Africa.

**Extended Producer Responsibility (EPR)** in the construction sector may be needed to drive design for refurbishment, design for recycling, deconstruction to retain materials in use or for recycling, as well as recycling of construction materials. However, given the pressure the construction industry in South Africa has been facing due to slow economic growth, extreme drought conditions that stopped and limited construction due to restrictions on water usage, and the impacts of COVID-19, the use of disincentives, such as EPR fees, to promote circularity may prove to be counterproductive.

At this stage, the main voluntary driver of circularity is the Green Star Rating Tool of the **Green Building Council of South Africa** which includes points for local sourcing of materials, and inclusion of recycled content. However, this tends to act as an incentive only in the high-end market. Due to the costs involved in reporting as well as achieving certain targets in the absence of an enabling environment nationally, such an approach is unlikely to be widely applied across the South African construction sector.

## Conclusion

Opportunities in circular plastics in the construction industry are limited by the lack of both designing construction elements for circularity, and designing for useful deconstruction or modularity, as well as a demolition rather than a deconstruction approach to rebuilding. As such any plastics available through demolition or deconstruction are likely to have low value at end-of-life. However, driven through difficult economic times, salvage stores for a range of construction elements (including plastics) are common, and recovery and reuse of construction materials is particularly effective in informal settings in South Africa.

The potential for the construction industry to generate stronger demand for open-loop recycling into high value products, such as polyethylene piping, has not been well-explored or supported. These products may also be recovered for recycling at end-of-life.

The construction industry is also seen as a 'sink' by the plastics packaging producers for poorly recyclable plastics, which are included in low value plastic products such as a plastic 'wood', or plastic roof tiles, or in hybrid materials, such as plastics in concrete blocks. Production of these low-value materials is claimed by packaging producers as discharging their extended producer responsibility, but the resulting products will probably not be recovered for recycling at end-of-life.

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:

- o **Part 1:** The Plastics Landscape in South Africa – Mapping value chains and key players.
- o **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.

- o **Part 3:** Market assessment of circular plastics opportunities in packaging, construction, agriculture and the automotive industry.
- o **Part 4:** A focus on increasing recycled content in packaging through multi-layer conversion.
- o **Part 5:** Advanced recycling technologies in South Africa – status quo and potential.
- o **Part 6:** Alternatives to problematic plastic packaging in South Africa.
- o **Part 7:** The current state of waste plastics management in South Africa.
- o **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](mailto: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**.