GreenCape

Closing the Loop with HDPE: 50/Fifty Wheelie Bin

Building a resilient city through circular public procurement

Purpose

A circular economy keeps products, components and materials in the economy at their highest use and value at all times. A circular approach is also useful for ensuring a resilient system. Municipalities, especially metropolitan areas, are large consumers of goods and services. As such they are well placed to drive circularity at scale.

One of the many levers a city can implement to drive circularity at scale is through the concept of circular procurement. Nowhere is this more evident than through the City of Cape Town's (CCT) 50/Fifty refuse bin procurement programme.

Through its 50/Fifty programme, the CCT metropolitan municipality has leveraged its procurement policy to tangibly facilitate circularity at scale. More specifically, the CCT has used circular procurement to not only meet its constitutional mandate to ensure its citizens have access to waste services, but has diverted waste from its own landfills, secured end-markets for plastic recyclers, secured offtakes to their own bin waste, created circular jobs and more importantly, have secured job and businesses during a global crisis. All this without compromising price, quality, functionality, and longevity.

What is resilience?

In human terms, resilience refers to "the ability of an individual to recover from setbacks, adapt well to change and to keep going even when facing difficult circumstances". A resilient Cape Town is a compassionate, connected, and capable City, where Capetonians collaborate across households, communities and institutions, to build collective responses to the current and future social, environmental and economic challenges.

GreenCape would like to acknowledge the following stakeholders: Ian Oliver (City of Cape Town), Alison Davison (City of Cape Town), Janine Charters Mpact Plastic Containers Pty (Ltd). For more information on our circular economy support work visit the GreenCape website: https://www.greencape.co.za/content/sector/waste To contact GreenCape, email us at: info@greencape.co.za

The case study discusses:

- Diversion of plastic waste from landfill
- Procurement as a policy lever to stimulate circularity
- Local government as a catalyst for circularity at scale
- Building resilience through circularity
- Creating value from condemned material

It is written for:

Cities:
- Building resilience through waste diversion
- Strengthening public private partnership
- Reducing operational expenditure overheads
- Supporting supply and demand for recyclate
- Cities with resilience / circularity commitments

Waste Management Companies:
- Managing large bin stocks
- Reducing capital expenditure overheads
- Delivering sustainability commitments

Recyclers:
- Secure / diversify recyclate markets
- De-risking future business models
- Strengthen competitiveness

Background

In South Africa, local municipalities have a constitutional mandate to ensure that its citizens have access to refuse removal and disposal. One of the many ways municipalities provide this service is through the provision and collection of refuse bins. The municipality can procure these bins from private sector through a highly regulated tendering process. These tenders often include specifications that bidding suppliers must adhere to if they wish to be considered.

In 1991, CCT introduced 240 litre wheelie bins for household refuse collection. By the end of 2019 the CCT was servicing an estimated total of 925 000 bins[1]. Traditionally, these bins were made from 100% virgin high density polyethylene (HDPE) plastic that was sourced outside of Cape Town.

However, in November 2014, the CCT included highly progressive specifications into its refuse bin supply tender[2] that would ultimately secure offtake markets for the HDPE recyclers. The following specifications for bin body and lids were included:

- Comprised of 50% HDPE recyclate
- UV stabilised to protect form sun damage
- Minimum lifespan of 10 years
- Made from 100% local content
- Recyclable at end of life

A further key specification included the inclusion of an exchange condition. This being that the winning contractor was to collect all condemned and/or damaged bins[3] and to process them into new bins ensuring the closed loop specification[4].

Circular procurement:
the process by which the public or private sector acquire goods or services that contribute to closed energy and material loops, minimise negative environmental impacts and eliminate or reduce waste across the product's life cycle.

The CCT leveraged its procurement policy to facilitate circularity at scale. More specifically, the CCT has embedded circular procurement principles to not only divert waste from its own landfills, but to also reduce its own bin disposal liabilities, secure end-markets for HDPE plastic recyclers, create new circular jobs and, more importantly, ensure that jobs and businesses weather global crises. All this without compromising price, quality, and functionality.

Specifications making provision for recycled content have also been included in the CCT's latest home composting container supply tender.

KEY INSIGHTS

The 50/Fifty Wheelie Bin Project builds resilience by:

- ✓ Embedding circularity in procurement
- ✓ Facilitating the creation of local jobs
- ✓ Secures local jobs during crisis
- ✓ Secures business during crisis
- ✓ Reduces City overheads
- ✓ Reduces City risk due to commodity price volatility
- ✓ Reduces supplier risk due to commodity price volatility
- ✓ De-risking the recycling value chain by ensuring end-markets and stabilising supply/demand dynamics for recyclate.
- ✓ Extending landfill airspace for future problematic wastes
- ✓ Ensures sustainable service delivery

Key lessons include the importance:

- ✓ It is possible to supply quality bins at scale with 50% recycled content
- ✓ Ensuring a 10-year guarantee ensures quality and longevity of investments
- ✓ Bins must be able to withstand ultraviolet radiation from the sun
- ✓ There must be a product supplier who can provide bins at scale

[1] Of which ~850,000 were 240 litre bins and ~75,000 were 140 litre bins

[2] The 2020 tender (261G/2019/20) was awarded to the Mpact Plastic Containers Pty (Ltd).

[3] The bins are routinely retrieved back from residents on request and replaced with new bins - this portion of the system is also a closed loop, which the City implements.

[4] The contractor is also required to supply one free bin in exchange for every 65kg of condemned/damaged lid and body material.

Impact[5]

Landfill Airspace: Since inception (Nov 2014) 1 191 tonnes of bin material has been shifted to recycling. Due to extensive research and development, the processing inefficiencies are extremely low at between 3 - 5%. Thus 1 132 - 1 156 tonnes of HDPE has been diverted from landfill. This equates to a total of 1 053 - 1 121m^3 of landfill airspace saved, assuming effective compaction or an ±175 - 187m^3 of airspace saved per year. Thus, more airspace has been secured for more problematic waste streams.

Raw Material Substitution: The CCT has received 378 328 refuse bin from the bin supplier since inception, of which 50% (1 986 tonnes) includes virgin HDPE, and 50% (1 986 tonnes) include recyclate. Virgin HDPE is high quality and extremely sought after by multiple markets. To meet traditional bin specifications, additives would have to have been added to virgin material to produce the black refuse bins. This limits end markets for recycled HDPE[6]. These specifications not only strengthen the end-market for coloured HDPE recyclate, but has also unlocked 1,986 tonnes of virgin HDPE to serve more quality demanding markets such as food grade packaging.

Cost Savings: The CCT pays between ±R25.00 - R28.00 less per 50/fifty bin compared to a 100% virgin bin. At an average of 60 000 bins per year over six years, this has resulted in a saving of R9 - R10.1 mill since inception. This results in an estimated saving of R1.6 - R1.7 million in 2020 alone.

Further cost savings: For every 65kgs of broken / condemned bin material supplied to the contractor, the CCT is provided a new bin. This has resulted in 18 328 free bins supplied to the City, translating into a cost saving of plus/minus R366 per bin. This has resulted in a further saving of R6.7 million.

Local Material Security: By including the bin-to-bin specification into the tender document, the CCT is diverting its own condemned bins for processing into new bins. In effect securing feedstocks for its own bins. These feedstocks are locked and not impacted on by external forces such as price fluctuations and global material shortages.

Job Creation: 13 permanent jobs and 18 part-time jobs have been created as a result of this procurement specification. It is also worth noting these jobs are local.

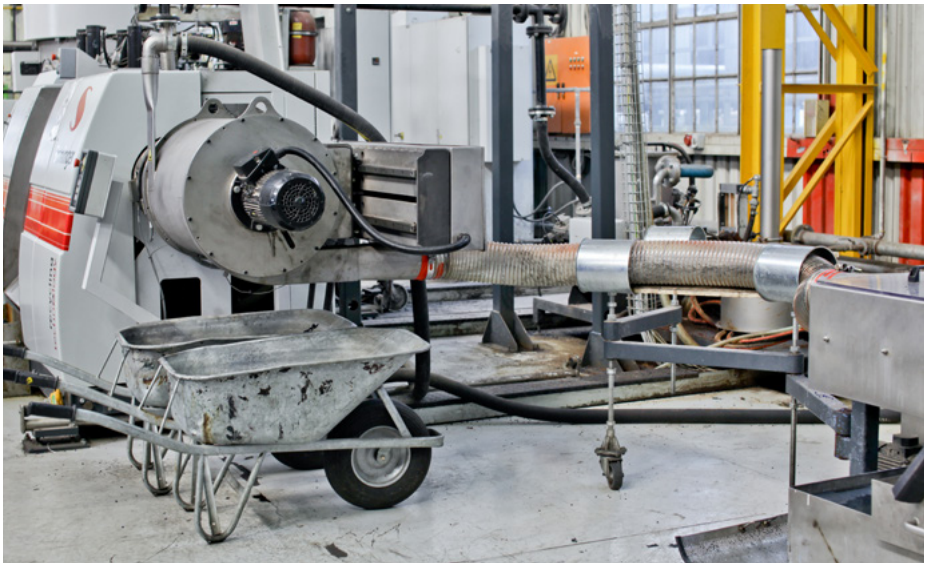
Job Security: This contract has secured work for the contractor and its employees for the duration of the tender period (3 years). This includes during times of economic crisis; such has been the case during the COVID-19 pandemic currently being experienced.

Revenue Generation: The 2019/20 tender has secured the contractor R145 million for the next 3 years. This prospect of revenue is valuable in the face of a global crisis. By remaining competitive in the free market, attuning itself to the City's specific requirements and diversifying its service offering to meet the CTTs procurement specification, this contractor has competitively won this tender for three successive periods.

GHG Emission Savings: Where recycling a single kilogram of HDPE generates ±1.04kg of Scope 2 CO_2eq emissions, Virgin HDPE has a CO_2eq footprint of ±1 .9 kg CO_2eq per kg. This equates to a CO_2eq saving of 0.86 kg CO_2eq per kg HDPE, or 4.3 kg CO_2eq per 50/fifty bin produced. Since inception, the initiative has reduced its Scope 2 CO_2eq emission of bin procurement by 1 708 tonnes. A formal, audited study is still to be undertaken.

SA Plastics Pact: This procurement specification illustrates the CCT's commitment-through-action to honour its role as a supporting member of the South African Plastics Pact[7].

Ring-fenced Benefit: In some cases, cities auction off recyclable plastic waste to recyclers. The funds generated through this auction are then directed not to the solid waste management department to benefit from, but rather to the overall municipal fiscus. This is subsequently spent elsewhere other than necessarily waste. The CCT's exchange specification allows the solid waste management department to directly benefit from the diversion. In this case, "free" refuse bins.



[5] 01 November 2014 - 30 November 2020

[6] Charcoal coloured HDPE has a narrower range of recycling applications than HDPE of other colours

[7] www.saplasticspact.org.za

The ongoing 50/Fifty Wheelie Bin Project helps build resilience in Cape Town, in the following ways:

1. **Decentralisation of collection, manufacturing, distribution and knowledge**

Through the tender process, Mpact Plastic Containers Pty (Ltd) (Mpact) is responsible for the collection, manufacturing and distribution of wheelie bins. The decentralisation of this process allows the public sector to facilitate the growth and development of the recycling industry within the private sector. As time progresses, industries within the private sector can leverage the offerings developed within the recycling sector. Furthermore, Mpact is able to constantly trial and innovate this process ensuring optimal efficiencies and maximised recyclate inclusion.

2. **Encouraged Learning and Skills transfer**

The establishment of closed loop systems requires continuous and adaptive learning. The individuals involved in the development and implementation of the current system adopt new skills and are able to pursue their careers in a flexible way. Solution building and adaptation to changes are vital skills to be more resilient and allow for constant development.

3. **Resource Efficiency and Feedback Loops**

Wheelie bins are produced according to the demand communicated by the City to create a resource efficient system. In a circular economy, reuse and reduce strategies are higher ranked than recycling. To this end, all wheelie bins are given a ten (10) year warranty and production batches are tested at random according to the required SANS quality and production standards for quality assurance and adherence to standards, this ensures that the useful life of the wheelie bin is maximised.

All raw materials are sourced locally, thereby reducing the risk of an overly connected supply chain.

4. **Securing long term availability of airspace for problematic waste**

The CCT has less than 15 years of airspace. The diversion of ±200 tonnes a year of bin material from landfill results in increased landfill airspace for waste streams that are not yet regenerative or cyclic.

5. **Raw Material Diversification**

The wheelie bin is produced from 100% HDPE comprising of both virgin materials and recyclate. The redundancy of materials performing a similar function can be used when needed and builds resilience by providing alternative and substitute elements should disturbances or failures be experienced in the supply chain.

IN THE CONTEXT OF CAPE TOWN'S RESILIENCE STRATEGY, THIS ENTERPRISE & INVESTMENT CASE STUDY ADDRESSES

Stresses / Shocks

- Economic crisis
- Rapid urbanisation
- Unemployment
- Infrastructure failure

Qualities of a resilient city

- Job-creating city
- Adaptable city
- Robust city
- Fexible city
- Resourceful city

RESILIENT CAPE TOWN PILLARS

PILLAR 1: People **Compassionate,** holistically healthy city

PILLAR 2: Place & Space **Connected,** climate adaptive city

PILLAR 3: Economy **Capable,** job creating city

PILLAR 4: Disaster readiness **Collectively,** shock-ready city

PILLAR 5: Governance **Collaborative,** forward-looking city

PILLAR 3
Cape Town is a capable, job-creating City

VISION
Capetonians turn the challenges of resource constraints and rapid technological change into new opportunities.

GOAL 3.1 Foster green economic growth	**GOAL 3.2** Enable enterprise development in the informal economy	**GOAL 3.3** Connect the workforce with a changing economy	**GOAL 3.4** Collaborate with businesses to achieve a resilient local economy

PILLAR 5
Collaborative, forward-looking City

VISION
Our City government works collaboratively to mainstream applications of resilience across systems and silos.

GOAL 5.1 Develop and approve portfolios of projects that maximise the resilience dividend	**GOAL 5.2** Mainstream resilience in decision-making	**GOAL 5.3** Enhance knowledge management and data use	**GOAL 5.4** Monitor and evaluate resilience outcomes

WHAT IS THE GREEN ECONOMY?

The working definition for the green economy as it relates to Cape Town is: "expanded economic opportunities created through the provision of goods and services and the use of production processes that are more resource-efficient, enhance environmental resilience, optimise the use of natural assets and promote social inclusivity."