



Ministry for Foreign  
Affairs of Finland



# Circular Economy Opportunities in Zambia

Results from the AGS Circular Economy Market  
Study Presented at FinnBiz week 23/02/2023



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The Zambian Circular Economy Study was conducted under The Accelerated Growth for SMEs (AGS) Programme private sector development initiative and funded by the Ministry for Foreign Affairs of Finland.

The overall aim is to understand the market needs in Zambia and business opportunities for the private sector in the circular economy space based on raw material available in Zambia for recycling and manufacturing.

Tandem Circular conducted the study in collaboration with AGOVA, Trinomics and ACEN.



# Introduction

Circular economy offers opportunities to **eliminate waste and pollution**, **circulate products and materials** (at their highest value), and **regenerate nature**.

Zambia generates large volumes of waste which contain **significant value**. In order to capture this value, waste materials and products need to be **separated and recovered** into circular systems, which can contribute to **growth of the economy, job creation, climate change mitigation and green growth**.

This study identified ten opportunities which, when combined present an economic opportunity estimated at **US\$ 712 million** through capturing available raw materials for sale to existing markets, conversion into energy or manufacturing into valuable end products - in particular to substitute imports with locally produced alternatives.



# Circular Economy (CE) in Zambia

## ENABLING ENVIRONMENT

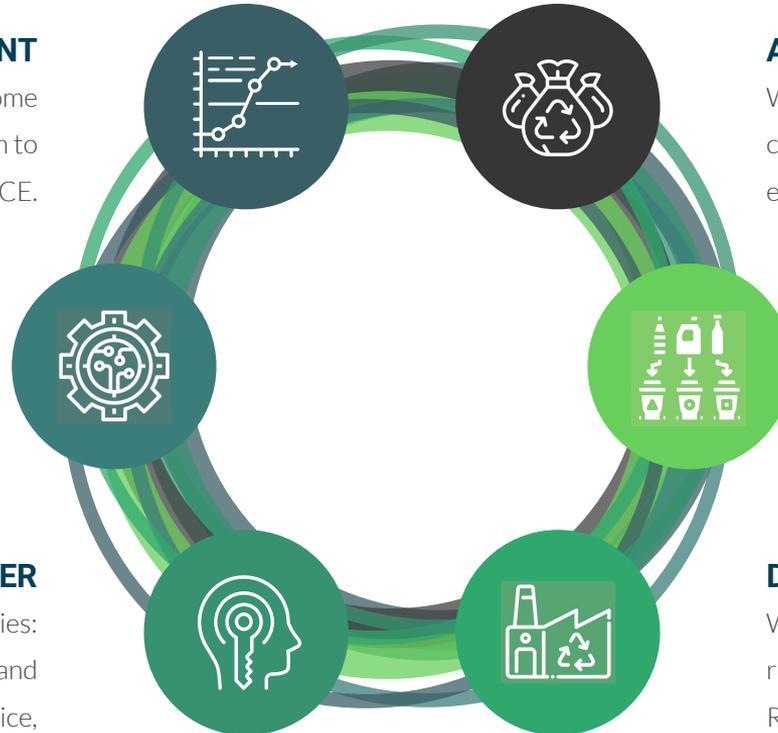
Legislation encompasses circularity and some incentives are in place. There is momentum to improve implementation to enable a more CE.

## TECHNOLOGY TRANSFER

Technology can enable the capture and processing of waste resources, and development of new circular businesses.

## SKILLS TRANSFER

Capacity building to develop opportunities: recover and recycle resources, repair and re-manufacture, especially in the service, sharing and platform economy.



## AVAILABLE RESOURCES

Waste is available and waste value chains can be further organised and formalised to extract valuable resources from waste.

## SEPARATION AT SOURCE

Behaviour change and incentives can improve separation of resources before they enter waste streams.

## DEVELOPING INDUSTRY

While the value chains are underdeveloped, recycling industries exist for many resources. Re-use and Repair culture is strong, mainly in the informal sector.

# Priority sectors for Circularity

## MUNICIPAL SOLID WASTE (MSW)

Waste management (especially in cities) is key to capturing valuable resources and mitigating environmental and social impact. MSW has high potential for inclusive growth, involving youth and women.

## MANUFACTURING

A significant contributor to the GDP (9% in 2021<sup>1</sup>), manufacturing is of high economic importance. It is key to processing waste resources into valuable products. Further opportunities exist to substitute imports with locally produced raw materials.

## AGRICULTURE

Over 50% of Zambians rely on agriculture for employment (World Bank<sup>2</sup>) and it is core to our economy (2.9% GDP in 2021<sup>1</sup>). There is large potential for growth, especially when applying circular and regenerative farming practices.



# Opportunities in Waste

## CONSUMPTION

Zambia generates over 3.7 million tons<sup>3</sup> of waste annually. This would fill **1,160 football fields** up to 1 metre high.

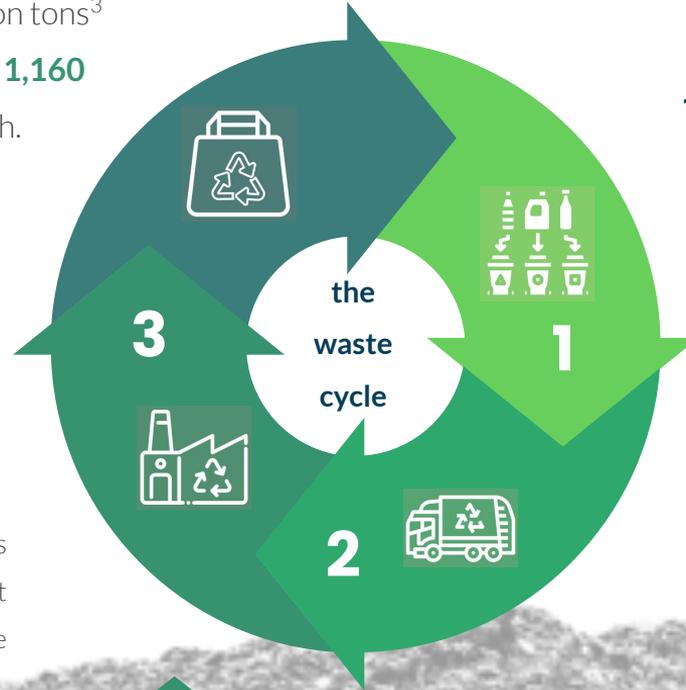
links to  
agriculture

electricity  
generated  
from waste

biogas  
as a clean  
cooking fuel

## 3. WASTE TO ENERGY

- developing new facilities
- financing new equipment
- improving technical expertise



potential  
revenue from  
collection fees

## 1. SEPARATION AND COLLECTION

- wet & dry separation
- new equipment
- transfer stations

trading  
waste on local  
and foreign  
markets

## 2. SALE OF VALUABLE WASTE

- local plastics markets to substitute imports
- regional markets for paper, metals
- International markets for metals & eWaste

links to  
manufacturing

# 1: Separation and collection of waste

55%<sup>12</sup> of waste (**2.05 million tons**<sup>7</sup>) is not collected each year, equivalent to **638 football fields** piled 1 metre high with waste.

## Opportunity:

separate waste into **wet** and **dry** and expand waste collection services

**\$ 69.43 million**  
potential revenue  
from new waste  
collection  
services<sup>7</sup>

## 2: Trading of valuable waste streams

**891 thousand tons<sup>7</sup>** of waste has potential for recycling. This is equivalent to **44.5 thousand truckloads** covering 980 km head-tail.

### Opportunity:

trading valuable waste materials on existing markets (local and foreign)

**\$ 129 million**  
potential revenue  
from valuable  
waste<sup>7</sup>

(Plastic, Paper, Metal and  
eWaste)

## 3: Waste to energy

**2,23 million tons<sup>7</sup>** of food and residual waste is available for biogas and incineration, which could supply **522 thousand households<sup>13</sup>** with clean cooking fuel or electricity.

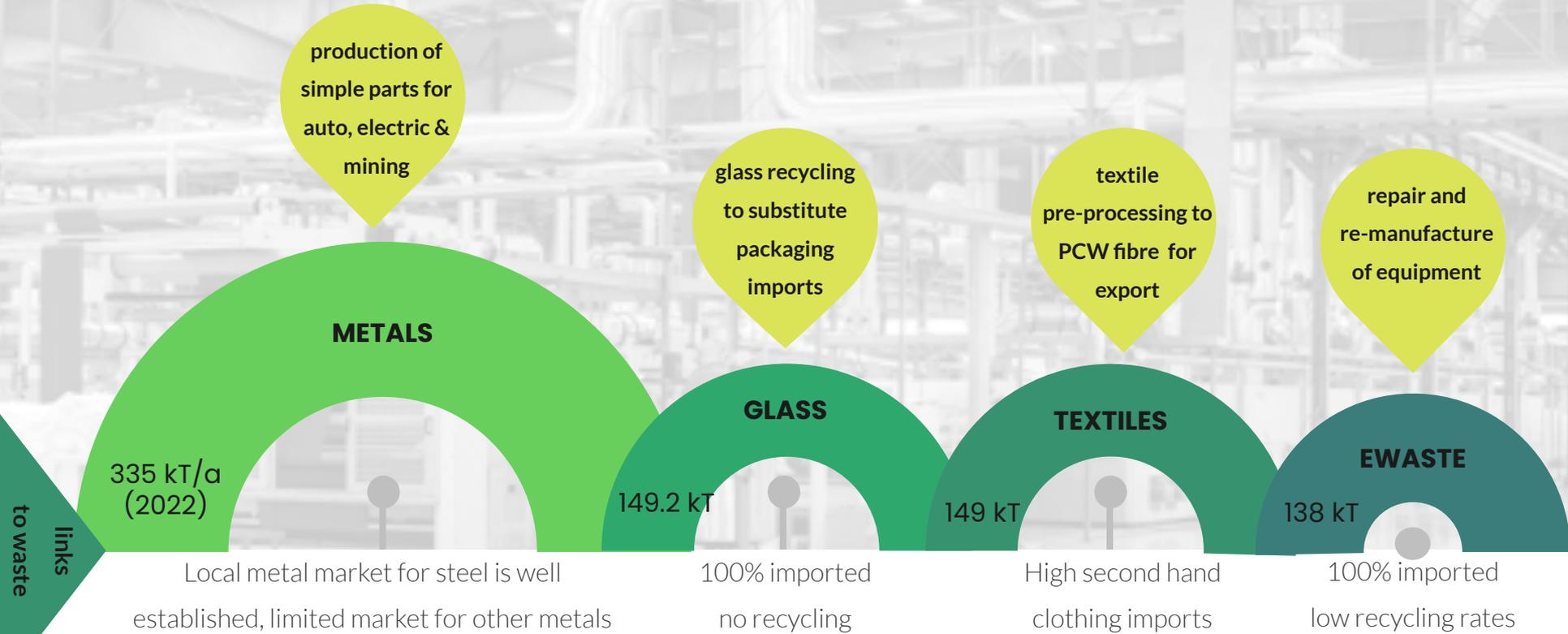
### Opportunity:

biogas from food waste

electricity from residual waste streams

**\$ 123.8 million**  
potential revenue  
from biogas and  
electricity sales<sup>14</sup>

# Opportunities in Manufacturing



## 4: Textile pre-processing and export

**\$ 89.5 million**  
potential revenue  
from sale of  
recycled fibres<sup>16</sup>

**149 thousand tons<sup>7</sup>** of textile waste is available annually. If recycled into fibres, these could make **13.5 million t-shirts<sup>15</sup>**.

### Opportunity:

cutting and shredding textile waste  
and exporting PCW derived fibres

## 5: Glass recycling and manufacturing

**\$ 14.3 million**  
potential revenue  
substituting  
imported glass  
packaging<sup>5</sup>

**149.2 thousand tons<sup>7</sup>** of glass waste is available annually, which could produce **13.1 million<sup>17</sup>** 340ml bottles and substitute imports **100%**.

### **Opportunity:**

recycling waste glass into bottles  
to meet local market demand

## 6 & 7: Production and repair parts and equipment

**\$ 48.6 million**  
imported parts  
and **\$ 1.2 billion**  
equipment<sup>5</sup>  
(mechanical &  
electrical)

**335.5 thousand tons<sup>7</sup>** of scrap metal and **138 thousand tons** of eWaste is available annually.

### **Opportunity:**

developing local equipment repair capacity and producing simple spare parts from available scrap metal

# Opportunities in Agriculture

links  
to waste



## BIOFERTILISER

Imported chemical fertilizers can be replaced by local biofertiliser produced from food waste and livestock manure

biofertilizer  
food waste and  
manure<sup>8</sup>



## COMPOST

Crop residues are currently burnt by most farmers, but could be used to produce compost, improving soil health and providing nutrients for crops

Composting  
crop residues  
on farm



## ANIMAL FEED

Food waste and abattoir waste can be converted into high protein animal feed through rendering or Black Soldier Fly farming

High-protein  
animal feed from  
food waste

## 8: Centralised organic fertiliser production

### Opportunity:

production of biofertiliser from organic waste and animal manure

**2.2 million tons<sup>7</sup>** of food, garden waste and animal manure is available which could produce **237 thousand tons<sup>19</sup>** of biofertiliser: **21,190 truckloads.**

**\$ 123.4 million**  
potential revenue  
from biofertiliser  
sales<sup>18</sup>

## 9: Onsite compost production from crop residues

### Opportunity:

products and services for compost production from crop residues

**151 thousand tons<sup>7</sup>** of crop residues available, could produce **29.7 thousand tons<sup>18</sup>** of organic compost to replace **5,033 truckloads** of chemical fertiliser.

**\$ 33 million**  
potential savings  
on chemical  
fertilisers<sup>5</sup>

## 10: Animal feed production

### Opportunity:

produce high-protein insect meal  
(BSFL) from urban food waste

**1.23 million tons<sup>7</sup>** of food waste available could produce **86 thousand tons<sup>20</sup>** of insect meal and feed for **2.3 million chickens<sup>21</sup>** every year.

**\$ 131 million**  
potential sales of  
high-protein insect  
meal<sup>5,7</sup>

## Recommendations

- 
- Research to **validate**, and expand the business opportunities
  - Build **strategic partnerships** to:
    - access symbiotic relationships
    - mobilise financial sources
  - Make business models **fit for the Zambian context**
  - **Capacity and skills** development for circular economy
  - Innovative **financing** for circular economy
  - Develop an **enabling environment** for circular economy

# References

1. 2021, Central Statistical Office, Zambia. <http://www.zamstats.gov.zm/>
2. 2021, International Labour Organization, ILOSTAT database. <https://data.worldbank.org>
3. 2018, World Bank, WHAT A WASTE 2.0. <https://datatopics.worldbank.org/what-a-waste/>
4. 2017, International Labour Organization, WASTE AS A RESOURCE.
5. 2021, UN Comtrade Database. <https://comtrade.un.org/data/>
6. 2021, Lusaka City Council estimate.
7. 2022, TNO, Baseline assessment and analysis of existing circular economy initiatives and key players in Zambia.
8. 2021, Rashid & Shahzad, Food waste recycling for compost production and its economic and environmental assessment as circular economy indicators of solid waste management, Journal of Cleaner Production, Volume 317.
9. 2020, FAO, Sustainable Bioenergy Potential in Zambia. <https://www.fao.org/3/cb1528en/CB1528EN.pdf>
10. 2020, Average maximum biogas production from different feed stocks. <https://vikaspedia.in/energy/energy-production/bio-energy/biogas>
11. 2022, USAID Alternatives to Charcoal. <https://www.usaid.gov/documents/alternatives-charcoal>
12. 2022, Interview with Lusaka City Council (LCC)
13. <https://www.worlddata.info/africa/zambia/energy-consumption.php#:~:text=Per%20capita%20this%20is%20an,trade%20energy%20with%20foreign%20countries>
14. ZESCO average pricing as of February 2023.
15. [https://www.contrado.co.uk/blog/how-are-cotton-t-shirts-made-from-plant-to-your-wardrobe/#:~:text=The%20exact%20amount%20of%20cotton,is%20around%208oz%20\(226g\).](https://www.contrado.co.uk/blog/how-are-cotton-t-shirts-made-from-plant-to-your-wardrobe/#:~:text=The%20exact%20amount%20of%20cotton,is%20around%208oz%20(226g).)
16. <https://www.rvo.nl/sites/default/files/2021/06/Feasibility%20Study%20Textile%20Recycling.pdf>
17. <https://www.consol.co.za/products/bottles/05116902>
18. 2023, Interview with Albida agriculture
19. <https://www.sciencedirect.com/science/article/abs/pii/S0959652621026780>
20. 2023, Interview with Biobuu Tanzania
21. <https://www.gov.mb.ca/agriculture/livestock/production/poultry/basic-feeding-programs-for-small-chicken-flocks.html#:~:text=A%20broiler%20chicken%20will%20eat,finisher%20to%20reach%20market%20weight.>

# the team



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# about tandem



we support organisations in their transition to more circular practices



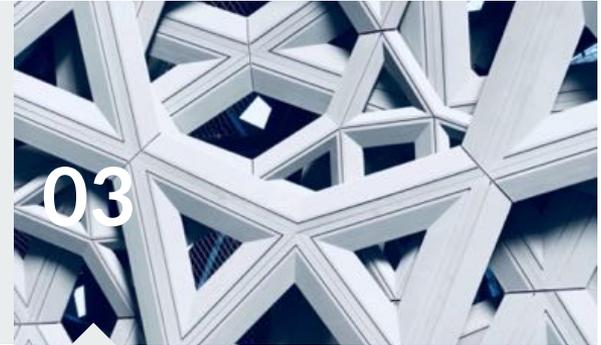
our mission is to drive a lasting positive impact on society and the environment by combining profitability and sustainability, and to develop a more circular economy across Africa.



01

## our approach

By implementing circular economy best practices, we aim not only to give companies a competitive edge and improve profitability but also provide a lasting positive impact on society and the environment.



03

## our experience

We have implemented a range of successful projects in Southern Africa in the waste, water, renewable energy, logistics and process optimisation space. We innovate to turn challenges into opportunities and pride ourselves in delivering top quality work.



02

## our people

We are a dynamic team of professionals who are passionate about circularity. With diverse backgrounds we bring a wide range of expertise covering Technical, Engineering, Finance, Supply Chain, Project Management and Process Optimization.

# thank you

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