



WALKERS RECYCLING

AUDIT 2023 - 2024

Avoided greenhouse gas emissions and impact on poverty through to recycling activities at Walker's Recycling between **July 2023** and **September 2024**



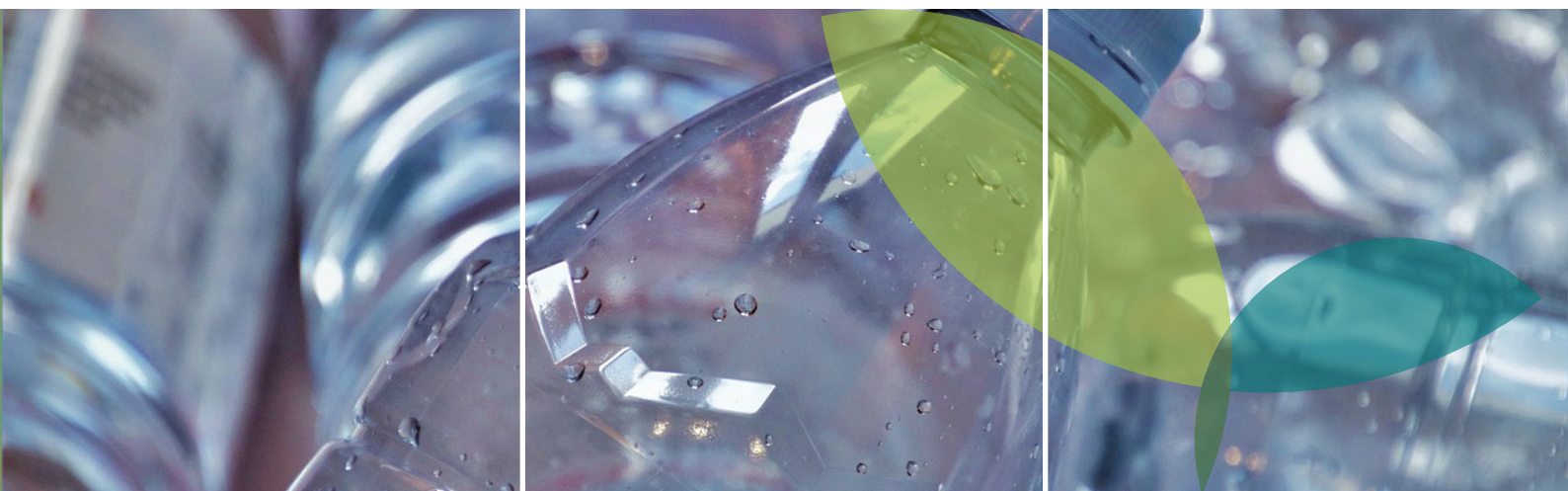
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Photo 1: Brothers Eddie and Christopher Walker, founders of Walker's Recycling project

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Executive Summary

The report presents the findings of an independent verification of the avoided greenhouse gas (GHG) emissions due to the recovery and recycling activities at Walker's Recycling (C and E Logistics T/A Walker's Recycling).

Reporting period: 01 July 2023 – 30 September 2024

Methodology: Emission reductions were based on the recycling of a number of different materials which included glass, aluminium, cardboard, polypropylene ("Polyprop"), polyethylene terephthalate ("PET"), high density ("HD") plastic and low density ("LD") plastic. GHG emissions avoided were estimated using the "closed loop approximation method" presented in the Greenhouse Gas Product Life Cycle Accounting and Reporting Standard, adhering to the project boundaries as discussed in the CDM Small-scale Methodologies AMS-III.AJ. DEFRA 2024 conversion factors were used.)

For the cardboard recycling, as the baseline scenario is the decay in a disposal site, the avoided methane emissions were also determined. Such emissions were calculated using the IPCC default method, which utilizes a mass balance calculation to estimate the

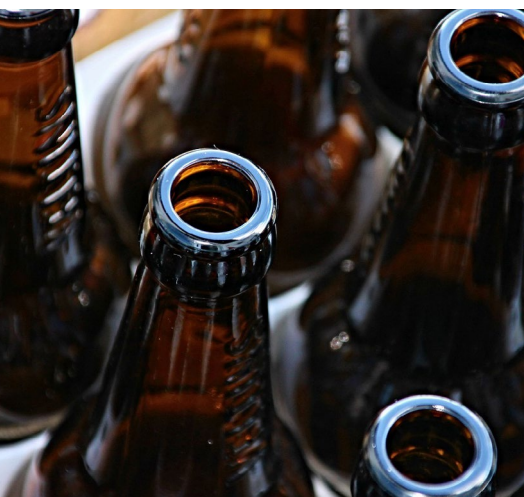
methane emitted from the disposal site and assuming all the methane is released in the same year the waste is disposed of.

Project emissions from diesel and electricity usage were calculated using relevant CDM tools and South African-specific emissions factors. These emissions were treated as a source of leakage and deducted from the gross avoided emissions.

Emission reductions achieved: 4 519 tonnes CO₂eq (01 July 2023 – 30 September 2024).

Additionality and potential double claiming:

The revenue from carbon credits has been instrumental in driving the resilience of the recycling business as well as the community surrounding the project. Furthermore, a careful examination has affirmed the project's integrity by confirming the absence of any instances of double claiming.



Credible Carbon Standard Assessment Questions

Is the project real?

A site visit confirmed the project is in place and real.

Is the described technology in place and functioning in accordance with its design specification?

The auditors witnessed that recyclable material is transported to and collected at the site in numerous vehicles. Here it is sorted, pressed and stockpiled for sale using on-site equipment where needed, before the material is transported and sold to offtakers. These operations divert waste that would otherwise have been dumped or ended up in the City of Cape Town's landfill sites.

Are the estimates of greenhouse gas emissions reduction reasonable in terms of accepted international standards and unbiased towards buyer or seller?

The estimates presented in this report are based on a life cycle view consistent with the appropriate internationally accepted standards and thus are a reasonable representation of the emissions avoided due to Walker's Recycling operations.

The 2024 UK DEFRA emission factors have been applied in this assessment to quantify the avoided emissions associated with recycling activities. While these internationally recognised factors ensure methodological consistency and comparability, they are considered conservative in the South African context. This is primarily due to South Africa's higher grid emission intensity compared to the UK, as well as differences in landfill gas capture rates and baseline waste management practices. As such, the avoided emissions reported here likely underestimate the actual climate benefit of the project under local conditions.

Is there a discernible impact on poverty?

Yes, the project creates jobs, supports informal workers, and invests in social outreach and education. In addition, emotional well-being, identity, and purpose are reinforced.



01. Introduction

Since 2013, the Walker Recycling project has been claiming carbon credits through the Credible Carbon voluntary carbon market registry. The project, led by C & E Logistics, underwent its initial audit in 2015, and this report covers the sixth verification commenced in December 2024 and completed in April 2025 . The audit period spans **01 July 2023 to 30 September 2024**.

The audit was guided by the following Credible Carbon standard questions:

1. Does the project exist? Is the project demonstrably authentic?
2. Does the implemented technology function as specified?
3. Are the GHG emission reduction estimates in line with accepted international standards and unbiased?
4. Has there been an observable impact on poverty?

In the subsequent section (Section 2), the audit methodology is expounded upon, followed by the outcomes (Section 3), and a concise overview of responses to the four fundamental Credible Carbon questions (Section 4). The report concludes by offering recommendations for future actions (Section 5).

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02.

Verification Methodology

This audit assessed Walker's Recycling activities and the greenhouse gas emissions avoided from recycling. This was done by visiting the site, collecting data from records, and doing calculations based on the data. The process is explained below.

a. Interview and Site Visit

An on-site interview was held with the project managers in December 2024. The team observed sorting, weighing, baling, and dispatch of recyclable materials.

b. Data Collection

The key data required to assess emissions savings is the tonnage of material recovered, disaggregated by material type. Although there is a scale located on site, it is not consistently used to measure the tonnages of waste material handled by Walker's Recycling. The tonnages of sorted material purchased by downstream processors are, however, available from their delivery dockets, and were used as the primary data source for the verification. In addition, weighbridge slips produced by the offtakers of recovered material were available for certain of the materials.

The verification process involved a consolidation and aggregation of the monthly delivery dockets and weighbridge slips in excel, and then on a sample basis checking the documents against the source documents. The original paper or electronic versions of these dockets are stored on-site at Walker's Recycling.

Original paper versions of all Walker's Recycling fuel slips for purchases from July 2023 to September 2024 were also obtained for the purposes of calculating the project emissions related to collection and delivery of the materials.

Electricity payments by Walker's Recycling were also sourced in the form of bank statements showing payments for electricity to use in calculation of on-site project electricity related emissions.

c. Calculation of GHG Emissions Avoided

Methodology: GHG emissions avoided were estimated using the "closed loop approximation method" presented in the Greenhouse Gas Product Life Cycle Accounting and Reporting Standard, adhering to the project boundaries as discussed in the CDM Small-scale Methodologies AMS-III.AJ. and using DEFRA 2024 conversion factors.

For the cardboard recycling, as the baseline scenario is the decay in a disposal site, the avoided methane emissions were also determined. Such emissions were calculated using the IPCC default method, which utilizes a mass balance calculation to estimate the methane emitted from the disposal site and assuming all the methane is released in the same year the waste is disposed of.

Project emissions related to diesel and electricity consumed were calculated using the relevant CDM tools and applying local South African factors. Additionality is addressed in section 3(e) of the report.

Calculation: The avoided emissions were calculated by comparing the life cycle emissions of the relevant materials in a base case versus the recycled project case, as is required in both the Greenhouse Gas Product Life Cycle Accounting and CDM methodologies. The life cycle assessment considers the material's entire value chain, including raw material extraction, manufacturing processes, use and disposal. This ensures that all emissions produced in the recycling processes and downstream processing are accounted for.

Workings detailing the associated factors utilised for the respective calculation are included in Section 3C.

System Boundary: Base case involves virgin material production, manufacturing, use and subsequent disposal to landfill. The assumption that all waste is sent to landfill (rather than, for example, incineration) is appropriate as the City of Cape Town, under which the Walker's Recycling collection area falls, disposes of all non-recycled waste in two municipal landfill sites. The project case consists of closed loop recycling, which occurs when recycled material substitutes for virgin material in a similar quality application.



03.

Findings

The audit confirmed the following findings:

a. Site Visit

The site visit confirms an active site, consistent with past audit reports of the operations. Recycling activity was observed, including sorting, baling, and dispatch to offtakers. The auditors also observed housing provided to staff, and vehicles transporting waste materials. Since the last audit, Walker purchased new premises but leased those out, thus the premises were not relevant for this audit. The operations experienced equipment breakdowns and flooding during winter, resulted in a reduction of business activities for some months.



Photo 2: Walker's Recycling project co-founder Eddie Walker being interviewed by carbon auditor Trinity Makava Ncube in project site office.



Photo 3: Bagged waste material being brought onto site



Photo 5: Project staff sorting waste materials

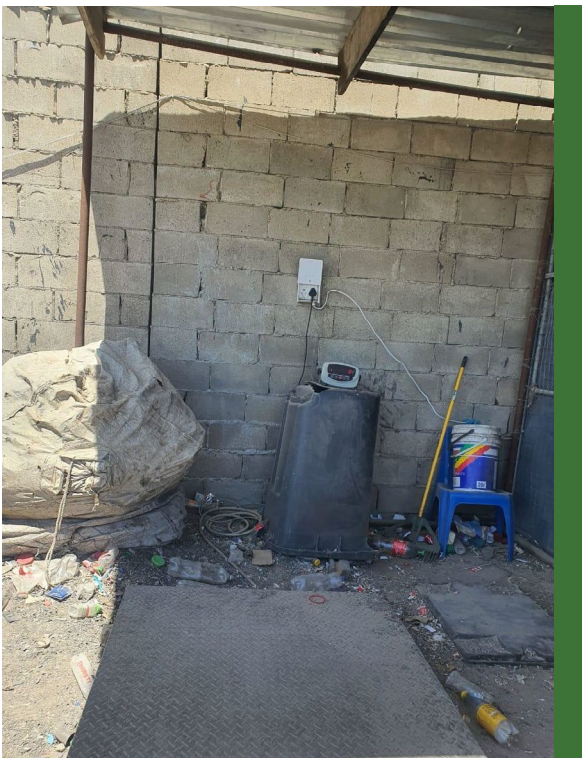


Photo 4: Scale used to weigh waste materials



Photo 6: Walker's Recycling bakkie and trailer transporting waste materials

b. Data Collection

Monthly invoices for each material category were reviewed and aggregated to derive the annual recycled material weight accurately for each specific recycling material. Specific invoices were subjected to random spot checks, with cross-referencing of weights from slips to their source documents across all instances. Volumes were also compared to the prior periods and management engaged to understand all material changes. This methodology was employed to authenticate the reported volumes of recycling by Walker's Recycling during the reporting period, underscoring the credibility of the recycling data presented.

c. GHG Emissions Avoided

The total estimated GHG emissions avoided through the Walker's Recycling activities for the audited time period amount to **4,519 tonnes CO₂eq**. The four major components of the calculation are detailed below:

- a) Add: Emissions avoided through the use of recycled materials (Table 1)
- b) Add: Methane Emissions avoided through not having cardboard go into municipal waste (Table 2)
- c) Less: Project emissions from diesel usage in the project (Table 3)
- d) Less: Project emissions from electricity usage in the project (Table 4)

EMISSIONS AVOIDED THROUGH THE USE OF RECYCLED MATERIALS IN A CLOSED LOOP PROCESSES

The below table for each of the materials shows the associated tonnage of the respective material recycled as well as the 2024 associated Material DEFRA factor for closed loop manufacturing (i.e recycled goods are used to manufacture a product rather than primary materials), with the output being the emissions avoided.

Table 1			
Material	1/07/2023 - 30/09/2024 Recycled Waste (Kg)	Life Cycle Emissions Savings (kg CO ₂ e / Ton Material)	01/07/2023-30/09/2024 Emissions Avoided (tonnes CO ₂ e)
Glass	228,920	580	133
Aluminium	27,527	8,116	223
Cardboard	165,839	102	17
Polyprop	481,878	1,265	610
PET	1,218,030	1,650	2,010
HD plastic	119,618	1,325	158
LD plastic	113,278	1,870	212
Total	2,355,090		3,363



METHANE EMISSIONS AVOIDED THROUGH NOT HAVING CARDBOARD GO INTO MUNICIPAL WASTE

Based on CDM methodology, the below formulae can be used to calculate the emissions avoided, with the table 2 below providing the units and associated calculation:

EQUATION 1

$$\text{Methane emissions (Gg/yr)} = (\text{MSW}_T \bullet \text{MSW}_F \bullet \text{MCF} \bullet \text{DOC} \bullet \text{DOC}_F \bullet F \bullet 16/12\text{-R}) \bullet (1\text{-OX})$$

Table 2

Item	Unit	01/07/2023-30/09/2024 Emissions Avoided (tonnes CO ₂ e)
Methane emissions per annum (Tons)	BE _{CH₄}	44
Municipal solid waste generated (Tons)	MSW _T	166
Fraction of MSW disposed to SDWS	MSW _F	100%
Methane Correction Factor	MCF	80%
Degradable organic carbon (fraction) (kg C/ kg SW)	DOC	100%
Fraction DOC dissimilated	DOC _f	0.5
Fraction of CH ₄ in landfill gas	F	0.5
Conversion of C to CH ₄	16/12	1.33
Recovered CH ₄ (Gg/yr)	R	0%
Oxidation factor (fraction – IPCC default is 0)	OX	0
Global Warming Potential Methane	GWP	28
CO ₂ Emissions	Tons CO₂	1,238

PROJECT EMISSIONS FROM DIESEL USAGE IN THE PROJECT

The CDM methodology to determine CO₂ emissions from fossil fuel combustion in process j are calculated based on the quantity of fuels combusted and the CO₂ emission coefficient of those fuels, as follows:

$$PE_{FC,j,y} = \sum_i FC_{i,j,y} \times COEF_{i,y}$$

Where:

- $PE_{FC,j,y}$ = Are the CO₂ emissions from fossil fuel combustion in process j during the year y
- $FC_{i,j,y}$ = Is the quantity of fuel type i combusted in process j during the year y (mass or volume unit/yr)
- $COEF_{i,y}$ = Is the CO₂ emission coefficient of fuel type i in year y (tCO₂/mass or volume unit)
- i = Are the fuel types combusted in process j during the year y

Table 3

Diesel Emission Factor	Kg/l	2.76
Diesel Consumed	litres	12,182
Emissions	tons	33.6



PROJECT EMISSIONS FROM ELECTRICITY USAGE IN THE PROJECT

Standard CDM methodology for calculation of electricity emissions

$$PE_{EC,y} = \sum EC_{PJ,j,y} \times EF_{EL,j,y} \times (1 + TD_{L,j,y})$$

Where:

- $PE_{EC,y}$ = Project emissions from electricity consumption (tCO₂/yr)
- $EC_{PJ,y}$ = Quantity of electricity consumed by the project (MWh)
- $EF_{grid,y}$ = Emission factor for the grid (tCO₂/MWh)
- DL_y = Transmission and distribution losses in the grid (%)

Table 4

Project Electricity Consumed (MWh/year)	$EC_{PJ,y}$	49
Emission Factor for Electricity	$EF_{EL,y}$	0.99
Transmission & Distribution Losses	$TD_{L,y}$	0%
Project Emissions (tCO ₂ /year)	$PE_{EC,y}$	48

d. Changes Since the Previous Audit

In comparison with the previous audit period, Walker's Recycling has implemented several operational changes aimed at improving efficiency, optimising logistics, and responding to site constraints:

1. Increased Bale Density

To reduce handling time and maximise output, machines were upgraded with larger pumps to produce heavier bales by approximately 50% – increasing from 160 kg to 190 kg per bale. This has enabled the facility to reduce baling frequency and load more material per unit handled.

2. Optimised Trailer Capacity and Routes

Diesel usage was optimised by upgrading trailers from 4-metre units to 5- and 6-metre trailers, allowing for increased load capacity. Each delivery load increased from approximately 20 to 30 bags, thereby reducing the number of trips required to deliver or collect materials.

3. Shift in Collection Model

The business transitioned from a delivery-based model to a collection-based model, with buy-back centres delivering to and offtakers now collecting materials from Walker's site. This has significantly decreased the project's vehicle usage and improved time management on-site.

4. Reduced Baling of Non-PET Materials

Due to time constraints and prioritisation of PET, baling of other recyclable streams was discontinued during this audit period. Material is now sorted and weighed, but not always baled unless necessary. Some material was purchased pre-baled. Both of these factors reduce project electricity usage.

5. Customer Trailer Use

To facilitate larger and more efficient collections, trailers were made available to customers, enabling them to collect and deliver their own loads directly. This has both reduced the logistical burden on Walker's fleet reducing diesel usage and supported customer autonomy.

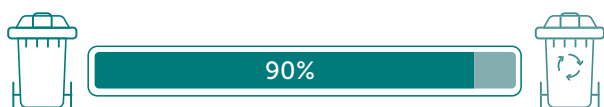


e. Additionality and Potential Double Claiming

In South Africa, approximately 90% of general waste is disposed of in landfills, with only about 10% being recycled or recovered for other uses¹. While the National Waste Management Strategy (2020) sets ambitious targets for waste reduction and diversion, implementation has been limited, particularly at the municipal level where technical and financial capacities are constrained². Currently, there are no enforceable national regulations mandating the diversion of recyclables from landfills³. Consequently, Walkers Recycling operates in a context where its activities are neither legally required nor commonly practiced, establishing a clear case for regulatory surplus. Furthermore, Walkers' operations rely on carbon finance to remain viable and to expand, as revenue from recyclable sales alone is insufficient to cover operating costs. Without the income from carbon credits, the scale and sustainability of the project would be significantly constrained.

Furthermore, certain poverty-alleviating advantages are tied to the business owners and the project operations, for example through engaging youth and younger learners in funded school readiness programmes, waste management experiences and funded adventures that allow the kids to experience the greater Cape Town area.

There were no signs of double claiming. Carbon calculations were confined to Walker's operations. A cross-check of off-takers and other project registrations in the region confirmed no overlaps or shared claims.



f. Impact on Poverty

The carbon project audited is operated by C&E Logistics, a private company, which is locally known for its commitment to community development. C&E Logistics is a family business and intricately connected to the community in which the business founders are at home.

Positive and supportive family values guide the business operations that extend generous benefits to staff and surrounding community members. While the company provides stable employment, its key contribution to poverty alleviation lies in the opportunities created for informal workers—particularly trolley pushers—who benefit directly from the company's operations.

Walker's supported 15 buy-back centres, working with approximately 40 informal waste collectors daily.

A unique opportunity to support the community presented itself when the old research station on Marion Island was demolished. Over 90% of the building materials from the old research buildings were diverted from landfill, as the Walker project distributed it in the community to struggling households to use as firewood in winter.

Community benefit activities include the company funding Grade R readiness classes in the area around site and funding a monthly adventures for the learners to provide them with access to experiences in the greater Cape Town region. Walker also works in partnership with the **Love Out Loud** programme of the bus transport company Intercap is in place, with activities including youth engagement in sorting waste collected on busses and then selling it (as part of the project's supply chain) and donating the income to fund meals for vulnerable families. The business founders also continue to support local micro-enterprises with business mentorship.

¹ GlobeNewswire. (2024). *Recycling and Waste Management Industry Insights: South Africa Faces Critical Challenges*. Published 1 March 2024. <https://www.globenewswire.com/news-release/2024/03/01/2838631/28124/en/Recycling-and-Waste-Management-Industry-Insights-South-Africa-Faces-Critical-Challenges.html>

² Department of Forestry, Fisheries and the Environment (DFFE). (2020). *National Waste Management Strategy 2020*. Pretoria, South Africa. https://www.dffe.gov.za/sites/default/files/docs/nationalwaste_management_strategy.pdf

³ CSIR. (2018). *South Africa State of Waste Report – Chapter 2: Waste Generation and Management*. Council for Scientific and Industrial Research. <https://wasteroadmap.co.za/state-of-waste-report.html>





Photo 7: Day out with Grade R learners

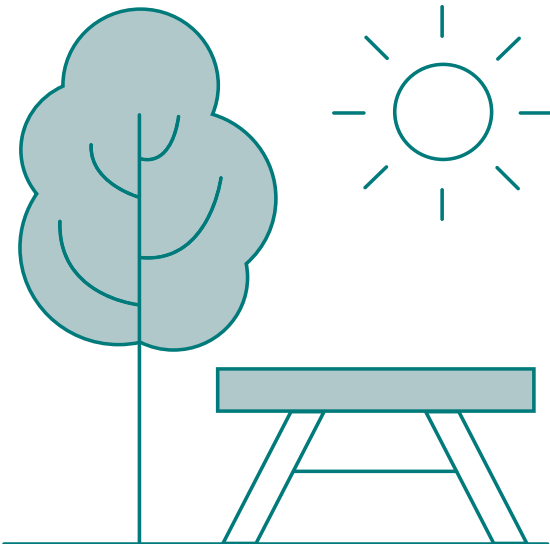
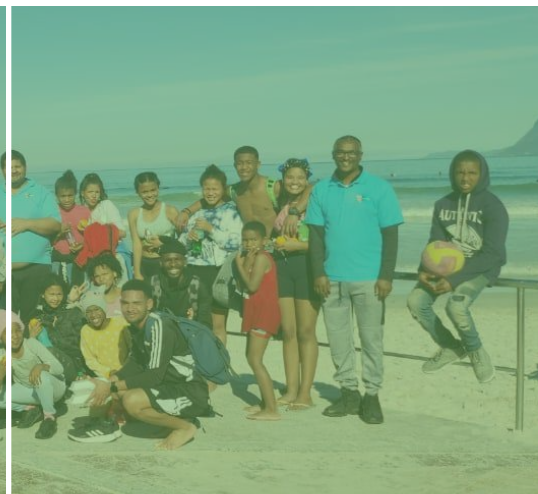


Photo 8: Monthly adventure day with Grade R learners



04.

Response To The Credible Carbon Registry Questions

1

Is the project real?

Yes. Walker's Recycling is operational and active.

2

Is the described technology in place and functioning in accordance with its design specification?

Yes. Sorting, baling, storage, and dispatch were witnessed on-site. Vehicles were active.

3

Are the estimates of GHG emissions reduction reasonable in terms of accepted international standards and unbiased towards buyer or seller?

Yes. Calculations used DEFRA 2024 factors and IPCC methodology, aligning with CDM guidelines. Emissions factors are conservative.

4

Is there a discernible impact on poverty?

Yes. The project creates jobs, supports informal workers, and invests in social outreach and education. Emotional well-being, identity, and purpose are reinforced.

Is the project real? Yes. Is the described technology in place and functioning in accordance with its design specification? Yes. Are the estimates of GHG emissions reduction reasonable in terms of accepted international standards and unbiased towards buyer or seller? Yes. Is there a discernible impact on poverty? Yes. Is the project real? Yes. Is the described technology in place and functioning in accordance with its design specification? Yes.



05.

Recommendations

The following recommendations are put forth again for consideration in shaping future operations and assessments of Walker's Recycling:

- 1** To enhance accuracy and accountability, it is advisable to modernise the data filing and recording system for documenting tonnages sold. Transitioning to a digital, auditable format is recommended. This involves individual capture of each slip, monthly summations performed within a spreadsheet, and subsequent total calculations derived from the captured dataset. Both physical paper slips and electronic copies (photos) should be readily available for auditing purposes. To safeguard against data loss, it is suggested that slip backups be stored off-site and in the cloud. This systematic recording approach will streamline forthcoming audits and safeguard the integrity of data and associated carbon credits.
- 2** For forthcoming audits, it remains imperative to apply emission factors that are most closely aligned with local conditions. Should emission factors specific to South Africa become accessible, their utilisation is strongly recommended to yield emission calculations that are more representative. Recognising the conservatism incorporated into the use nature of the DEFRA emission factors, employing localised emission factors will likely result in a higher estimation of calculated avoided emissions.
- 3** As noted in previous audit cycles, the recycling credits claimed carry the potential risk of double counting, especially if upstream producers or downstream purchasers of the recycled materials also assert the same avoided emissions. Walker's Recycling should be mindful that future negotiations might be necessary to clarify ownership of the emission savings.



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