Plastic Waste Reduction Standard

PLASTIC WASTE RECYCLING & IMPROVING WASTE PICKER LIVELIHOODS IN KENYA

Document Prepared by South Pole Carbon Asset Management Ltd.

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1 PROJECT DETAILS

1.1 Summary Description of the Project

The "Plastic Waste Recycling & Improving Waste Picker Livelihoods in Kenya" project is a grouped plastic waste reduction activity developed and coordinated by Taka Taka Solutions[1] Ltd (TTS). This project (hereafter referred to as TTS Plastic Waste Recycling Program, or the TTS PWRP) aims to recover and recycle additional plastic waste throughout the host country of Kenya.

Baseline scenario. Current waste disposal methods are extremely harmful to human and environmental health: 92% of plastic waste produced in the Kenya region is mismanaged[2] and less than 10% of overall waste is recycled. In the case of Kenya, around 56%[3] of the total amount of plastic waste is openly burnt, leading to air pollution problem. The plastics now targeted under TTS PWRP could not be managed as there were no recyclers or alternative waste technologies able to manage the plastic types. Hence, these materials were taken to the dumpsite for disposal. A detailed overview of baseline scenario is mentioned under section 3.5.

TTS PWRP collection activity and recycling activity operations: Taka Taka Solutions runs end-to-end plastic collection and recycling operations in Kenya (see Figure 2 for the process flow under section 1.10.2 below).

Collection activity & instance: The TTS PWRP activities begin at the collection stage. TTS sources (see section 1.10.1 for sources of collection) the plastic polymer types (referred in Section 1.2 below) and once the specified plastic waste is collected (and sorted if necessary), it is transported to TTS recycling facilities. In line with the VERRA Plastic Waste Standard's guidance (Section 3.3.6) it is defined under TTS PWRP that a "collection activity instance" is composed of either a single or a combination of buy back center, MRF and industrial plastic waste collection source controlled by TTS, wherein each project activity instance leads to collection of plastic waste from both or any informal and/or formal sources as applicable. Each single buy back center, MRF and Industrial Client acts as single instance of collection activity and is uniquely identified under Table 4 below in section 1.11.

Collection Instances: Please refer to section 1.11 for details as collection instances involves around 13 Instances. Out of 13 Instances, 8 are Buy Back center instances, 3 MRF instances and 2 Industrial Client Instances.

[1] https://takatakasolutions.com/
[2] https://plastichotspotting.lifecycleinitiative.org/wp-content/uploads/2020/12/kenya_final_report_2020.pdf, page 5.
[3] https://plastichotspotting.lifecycleinitiative.org/wp-content/uploads/2020/12/kenya_final_report_2020.pdf, page 24.

Recycling activity & instance: Refers to the "Mechanical Recycling" activities developed by TTS. TTS has both a rigid and a flexible plastic washing line, along with pelletizing capabilities. The TTS plastic recycling process (under section 1.11.2) is a mechanical recycling only, first shredding and grinding incoming plastic for easier processing. The product is washed and dried to remove the impurities before being transformed into higher value plastic pellets in plastic pelletizers at Recycling Instance 1 Ehotia Recycling unit. The recycled Plastic pellets are then sold to local manufacturers displacing virgin plastic for remanufacturing to finished products for the local economy.

Recycling Instance 1: It includes TTS "Mechanical Recycling" Pelletiser units at Ehothia. Please refer to section 1.11 for details of capacity at Ehothia.

The credit financing would allow the TTS PWRP to substantially address the abundance of plastic waste as much as possible from the natural ecosystem within the geographical boundaries host country Kenya; acutely reduce the use of virgin plastic by manufacturing companies by providing plastic pellets at an affordable price; and help in income-generating via sustainable jobs in the field of plastic waste recovery and recycling. This will take place both in the formal sector (TTS employees) and the informal sector (waste pickers).

TTS PWRP program start date is from the start of recycling operation (pelletizer unit operations) i.e. from 01/01/2022.

Estimates for the annual average and the total amount of recovered and recycled plastic waste as follows:

Total Collection Instances 13 has aggregated estimated annual average quantity of plastic waste recovered is 20,691 tons aggregated to total 144840 tons for the 7 years of crediting period.

(Note: Breakup of the estimated annual average recovered targeted plastic waste from individual instances are provided in plastic credit excel sheet for further reference and transparency.)

Recycling Instance 1 estimated annual average quantity of plastic waste recycled is 11888 tons aggregated to total 83214 . tons for the 7 years of crediting period.

Total amount collected and/or recycled during the current monitoring period from 01/01/2022 to 31/08/2022.

• The total collection Instances 13, collected quantity during this monitoring period of 8 months only is 1518 tons (WCC)

• The total recycling instance 1 recycled quantity during this monitoring period of 8 months only is 260 tons (WRC)

1.2 Project Type and Eligibility (2.1)

TTS PWRP is eligible under the scope of the plastic program due to the following:

a) Plastic waste type(s) managed by the project:

The project manages the following 5 types of plastic waste, which are all eligible for the plastic program, including but not limited to:

Table 1: Polymer type targeted for Collection and Recycling

Polymer Type targeted for Collection	Polymer Type targeted for Recycling
PP	PP
HDPE Flex	HDPE Flex
PS*	PS*
EPS*	EPS*
LDPE	LDPE
PET*	PET*

*PET, PS and EPS polymer is listed as material managed in the project; however, we are not accounting for its collection and recycling credits during the 1st monitoring period. Credits for the collection and recycling will be considered from the 2nd monitoring period onward, in accordance with the installed recycling capacity within the project scope or contracts with authorized end destinations. This will be subject to the fulfillment of applicability of Sec 4.0 Point 7 under PWRM0001 version 1.1 and PWRM0002 version 1.1.

a) The project is a grouped project activity involving multiple instances of multiple project activities:

TTS PWRP is a grouped project activity involving multiple collection activity and mechanical recycling activity of plastic waste. Details are given under section 1.11.

b) Activity type(s) in the project:

TTS PWRP involves plastic waste collection via Buy Back centers, MRF & industries and sorting, which further goes to TTS mechanical recycling unit at Ehotia.

c) Demonstration that the project has not generated plastic waste primarily for the purpose of its subsequent collection and/or recycling:

The project collection source are mentioned in Section 1.11 below. In addition, it is explained in the same section that the host country has a baseline scenario of unmanaged plastic waste. The plastic pollution problem is very acute, with current infrastructure capacities of local government bodies unable to manage the plastic waste. Thus, it is evident that the project does not generate plastic waste primarily for subsequent collection and/or recycling.

1.3 Project Configuration (3.3)

The project is a grouped project activity as described in the Plastic Waste Reduction Standard v1.0. The main objective of the TTS PWRP is to promote plastic waste management practices while creating jobs and income for the waste pickers to develop a sustainable solution for the community and the environment.

The current Collection Instances involves single activity instance of buy back centers, MRFs for formal collection and Industrial Clients for formal collection and is uniquely identified with under Table 4

The Recycling Instance is defined as the current installed and new installation and commissioning of mechanical recycling pelletizers by 31st December 2023 at the Ehothia recycling facility.

The TTS PWRP program has planned expansion of collection & recycling activities in the defined form of Collection Instance and Recycling Instances under section 1 within the geographical boundaries of host country Kenya. Further details of Collection & Recycling Instances has been given in Section 1.11.

Eligibility Criteria (grouped projects only) (3.3.13)

The project is a grouped project with the following eligibility criteria for inclusion of new project activity instances into the grouped project activity:

1) Applicability conditions: The future project activity instances under "Collection Instance Activity" & "Recycling Instance Activity" shall meet applicability conditions set out in the respective applicable methodologies PWRM0001 & PWRM0002 version 1.1 as defined in Section 3.2 for Collection & Recycling instance 1.

2) Geographical area: The future project activity instances to be included in the grouped project activity will be the activities involving plastic waste collection and mechanical recycling technology measures located within the host country, Kenya by TTS.

3) Baseline scenario: All future project activity instances shall meet the baseline scenario within the geographic boundary of Kenya as defined in respective methodologies PWRM0001 & PWRM0002 version 1.1 and as explained in Section 3.5.

4) Technology type: The future project activity instances to be included in the grouped project activity will be the activities involving plastic waste collection and/or mechanical recycling technology measures within the host country defined under Collection & Recycling instance in below section 1.11.

5) Additionality: The project activity instances to be added as part of the grouped project will meet additionality criteria as set out in the methodologies PWRM0001 & PWRM0002 version 1.1 and explained in below section 3.5 for collection & recycling Instances. The future collection & recycling instances will have the same characteristics with respect to additionality that are consistent with the initial instances.

6) Start date: The start date of each future project activity instance under the grouped project should not be prior to the start date of the grouped project. The start date of each project activity instance will be determined through documentary evidence as explained for collection & recycling instance under section 1.11.

7) The Grouped Project must meet specific requirements as stipulated by the Entity responsible for coordinating and managing grouped projects, and for conducting local stakeholder consultations and environmental impact assessment (EIA), as applicable at future instance level.

   Evidence of project ownership, with respect to each future project activity instance: This will held by the project proponent from the respective start date of each project activity instance (i.e., the date upon which the project activity instance began collecting and/or recycling plastic waste).

The following table demonstrates how the initial project activity collection & recycling instances mentioned under section 1.11 included in the grouped project activity fulfill the abovementioned eligibility conditions:

Table 2a : 13 Collection Instances eligibility criteria and its justification.

S.No	Eligibility Criteria	Justification (Y/N)
1	Applicability conditions: The project activity instances shall meet applicability conditions set out in the applicable methodologies PWRM0001 version 1.1 and its future updates.	13 Collection Instances meet the applicability conditions of methodologies PWRM0001 version 1.1, fulfilling this eligibility criterion. Please refer to Section 3.2 of this document for methodology applicability criteria.
2	Geographical area: The project activity instances to be included in the grouped project activity will be the activities involving plastic waste collection and mechanical recycling technology measures located within the host country, Kenya	All the 13 Collection Instances meets the applicability conditions as the instances are located within the host country, Kenya. Hence, this eligibility criterion is fulfilled.
3	Baseline scenario: All project activity instances shall meet the baseline definition as defined in respective methodology.	The initial collection project activity instances have the same baseline as per the methodologies requirements as detailed in subsequent sections. Hence, this eligibility criterion is fulfilled. Please refer Section 3.5 of this document for the baseline scenario.
4	Technology type: The project activity instances to be included in the grouped project activity will be activities involving plastic waste collection and mechanical recycling technology measures within the host country.	he initial project activity instances have the same technology type, i.e., they involve plastic waste collection using single buy back center, MRF and industrial clients within the host country. Hence, this eligibility criterion is fulfilled.
5	Additionality: The project activity instances to be added as part of the grouped project will meet additionality criteria as set out in the methodology.	The additionality for Collection instances is included in line with the respective methodologies, as demonstrated in Section 3.6 of this JPD&MR using penetration rate approach.

		Collection Instances are automatically additional as the penetration rate of the collection activity is below 20% in the host country, Kenya.
6	Start date: The start date of each project activity instance under the grouped project should not be prior to the start date of the grouped project. The start date of each project activity instance will be determined through documentary evidence.	The start date of the grouped project is considered as the earliest operation date of Pelletizer 1 (i.e., 01/01/2022) of the project activity instance and the start date of all other project activity instances after this date. All the collection instance collection from 1/01/2022 is considered from start date of project
7	The Grouped Project specific requirements stipulated by the Entity responsible for coordinating and managing grouped projects, and for conducting local stakeholder consultations.	Local stakeholder consultation has been conducted as a part of the grouped project activity. For any new project instance, a new LSC will be completed at Instance level. Hence, this condition is fulfilled.
8	The Grouped Project specific requirements stipulated by the entity responsible for coordinating and managing grouped projects and for getting relevant government approval/licenses for operating the plastic waste recycling facilities and/or EIA, as applicable	National Environmental Management Authority (NEMA) licenses have been issued. Furthermore, the relevant land lease agreements and Business Permits for collection have been taken from relevant county authorities
9	Evidence of project ownership, with respect to each project activity instance: This will be held by the project proponent from the respective start date of each project activity instance (i.e., the date upon which the project activity instance began collecting and/or recycling plastic waste).	Taka Taka Solutions is the owner for all the 13 instances. Project proponents have demonstrated that they have the legal right to control and operate project activities. Ownership documents in line with the Section 3.4.1 of the Plastic Waste Reduction Standard V1.0..

Table 2 b Recycling Instance 1 eligibility criteria and its justification.

S.No	Eligibility Criteria	Justification (Y/N)
1	Applicability conditions: The project activity instances shall meet applicability conditions set out in the applicable methodology PWRM0002 version 1.1 and its future updates.	Recycling Instances 1 meet the applicability conditions of methodology PWRM0002 version 1.1, fulfilling this eligibility criterion. Please refer to Section 3.2 of this document for methodology applicability criteria.
2	Geographical area: The project activity instances to be included in the grouped project activity will be the activities involving plastic waste collection and mechanical recycling technology measures located within the host country, Kenya	Recycling Instance 1 meets the applicability conditions as both the instances are located within the host country, Kenya. Hence, this eligibility criterion is fulfilled.
3	Baseline scenario: All project activity instances shall meet the baseline definition as defined in respective methodology.	The Recycling Instance project activity has baseline as per the methodological requirements as detailed in subsequent sections. Hence, this eligibility criterion is fulfilled. Please refer Section 3.5 of this document for the baseline scenario.
4	Technology type: The project activity instances to be included in the grouped project activity will be activities involving plastic waste collection and mechanical recycling technology measures within the host country.	The Recycling activity instances have the same technology type, i.e., they involve mechanical recycling technology within the host country. Hence, this eligibility criterion is fulfilled.
5	Additionality: The project activity instances to be added as part of the grouped project	The additionality for Recycling instance is included in line with the respective methodologies, as demonstrated in

	will meet additionality criteria as set out in the methodology.	Section 3.6 of this JPD&MR using penetration rate approach. Recycling Instance 1 is automatically additional as the penetration rate of the collection and recycling activity is below 20% in the host country, Kenya.
6	Start date: The start date of each project activity instance under the grouped project should not be prior to the start date of the grouped project. The start date of each project activity instance will be determined through documentary evidence.	The start date of the grouped project is considered as the earliest operation date of Pelletizer 1 (i.e., 01/01/2022) of the project activity instance and the start date of all other project activity instances after this date.
7	The Grouped Project specific requirements stipulated by the Entity responsible for coordinating and managing grouped projects, and for conducting local stakeholder consultations.	Local stakeholder consultation has been conducted as a part of the grouped project activity. For any new project instance, a new LSC will be completed at Instance level. Hence, this condition is fulfilled.
8	The Grouped Project specific requirements stipulated by the entity responsible for coordinating and managing grouped projects and for getting relevant government approval/licenses for operating the plastic waste recycling facilities and/or EIA, as applicable	National Environmental Management Authority (NEMA) licenses have been issued. EIA has been carried out for Recycling Instance as per host country regulations for the grouped project under the EMCA 1999 Act. Hence, this condition is fulfilled.
9	Evidence of project ownership, with respect to each project activity instance: This will be held by the project proponent from the respective start date of each project activity instance (i.e., the date upon which the	Taka Taka Solutions is the owner for the recycling instance at Ehothia site. Project proponents have demonstrated that they have the legal right to control and operate project activities. Ownership documents in line with the

	project activity instance began collecting and/or recycling plastic waste).	Section 3.4.1 of the Plastic Waste Reduction Standard V1.0..

1.4 Project Proponent

Organization name	Taka Taka Solution Ltd
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Organization name	South Pole Carbon Asset Management Ltd
Role in the project	Project Consultant
Contact person	Rohit Garg
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Telephone	+41-43 501 35 50
Email	registration@southpole.com

1.5 Other Entities Involved in the Project

No other entities are involved in the project.

1.6 Ownership (3.4)

Taka Taka Solutions is the owner for all 13 Collection Instances and 1 Recycling instance. Collection Instances operate on public and private leased lands for its

collection in accordance with host country policies and laws. The mechanical recycling sites are at the Ehothia site on private land.

Project proponents demonstrate that they have the legal right to control and operate project activities. Ownership documents in line with Section 3.4.1 of the Plastic Waste Reduction Standard V1.0 are given under Appendix 8.1 are submitted to the VVB. These include the following documents in the name of TTS.

1) Electricity bills for recycling activity Ehothia site
2) NEMA Licenses
3) Business Permit issued by Kenyan Government

1.7 Project Start Date (3.5)

The project start date is 1st January 2022 (01/01/2022) .

1.8 Project Crediting Period (3.6)

The grouped project activity adopts a renewable crediting period of seven years which can be renewed for a maximum of twice. This start date of the crediting period will vary based on the actual earliest commissioning/operation start date within the project activity instances of grouped project activity.

Crediting Period Start Date	Crediting Period End Date
January 1, 2022	December 31, 2028

1.9 Estimated Collected and/or Recycled Plastic Waste

Table 3 Estimated Annual Net Collected & Recycled quantities, Instances (Start date: 01/01/2022, End Date: 31/12/2028)

Year	Estimated Net Collected Plastic Waste[4] (tonnes)
2022	2383
2023	6048

[4] Detailed break up of plastic waste polymer wise & instance wise has been provided in plastic credit excel sheet for further reference.

2024	21366
2025	24653
2026	27940
2027	31225
2028	31225
Total estimated amount	144840
Total number of crediting years (where applicable)	7
Average annual amount	20691

Year	Estimated Net Recycled Plastic Waste (tonnes)
2022	1331
2023	3476
2024	12280
2025	14170
2026	16059
2027	17949
2028	17949
Total estimated amount	83214
Total number of crediting years (where applicable)	7
Average annual amount	11888

1.10 Description of the Project Activity

This section will provide an overview of the project activity, broken down into two sub-sections:

1. Overview of the Project Objective and Set-Up
2. Overview of Collection and Recycling Models

Under the guidance of the VERRA Plastic Waste Standard's eligibility criteria, projects can be described as grouped projects, subject to fulfillment of ethical requirements.

Grouped projects can include distinct instances of multiple instances of multiple project activities as per VERRA's Plastic Standard's Section 3.3.

Collection Instance: refers to the current TTS PWRP's Collection Activity and its current operational sites and those new collection sites which will be operational before end of 2023. This is defined as multiple instances of multiple activities for collection, as per the VERRA Plastic Waste Standard's guidance (Section 3.3.6). This is composed of either a single collection instance of individual Buy Back Centers, MRFs and Industrial Clients or any combination of Buy Back Centers, MRFs and industrial sources, where in each project activity leads to collection of plastic waste from both informal and formal sources as applicable.

Currently the buyback centers are in operation in Thika, Dandora, Kitengla, Mlongo and Mombasa with additional capacity through more buy back centers being commissioned. Each buy back center, MRF and industrial source acts as an instance of collection activity under the definition of grouped project as per VERRA Plastic Standard.

Table 4 : Project Instance Locations and Start Date

Lat Long coordinates	Buyback center	Project Instance Identifier	Start Date	Share (%)
1° 15' 1.26" S 36° 53' 40.884" E	Dandora	BB-01	1/1/2022	70
1° 4' 37.992" S 37° 7' 2.604" E	Thika	BB-02	1/1/2022	5
1° 29' 35.88" S 36° 58' 2.928" E	Kitengela	BB-03	1/1/2022	5
0° 8' 8.1492" S 34° 47' 45.6792" E	Kisumu	BB-04	7/1/2022	5
1° 23' 24.936" S 36° 58' 32.88" E	Mlolongo	BB-05	9/1/2023	3
0°16'42.8"S 36°02'25.3"E	Nakuru	BB-06	9/1/2023	5

3° 46' 2.3808 S 34° 49' 20.8596 E	Kakuma	B-07	6/1/2023	2
3° 49' 32.1276" S 39° 40' 51.24" E	Mombasa	B-08	1/1/2022	5
Lat Long coordinates	**MRF**		**Start date**	**Share (%)**
1° 8' 26.2068" S, 36° 43' 59.016" E	Ehothia	MRF-01	1/1/2022	50
1° 16' 39.954 S 36° 36' 15.044 E	Lusigetti	MRF-02	1/1/2022	35
4° 1' 24.5136" S, 39° 40' 52.86" E	Mombasa	MRF-03	1/15/2023	15
Lat Long Coordinates	**Industrial Client**		**Start date**	**Share (%)**
1° 21' 48.715"S, 36° 54"41.00"E	IC-01*		1/1/2022	1
1° 14' 7.587"S, 36° 52' 30.652"E	IC-02*		1/1/2022	1

Grouped Activity : Mechanical Recycling PWRM0002

Recycling Instance: refers to the "Mechanical Recycling" activities developed by TTS. TTS PWRP's Recycling activities include shredders, pelletizers, rigid washing lines and flexible washing lines etc. The details of Recycling Instance 1 are detailed below. This includes the commissioning of pelletizers at Ehothia for hard to recycle polymers including HDPE,PET,LDPE etc. All the scales are electronic weigh scales which are regularly calibrated.

Table 5a

Lat Long coordinates	Recycling Center	Start date
1° 8' 26.2068" S,36° 43' 59.016" E	Ehothia	1/12/2022

Table 5b

Pelletizer	Total pellet output	Plastic type	Start Date
EREMA	1,647	Flexi	1/1/2022
Taiwan	2,621	Flexi	1/9/2022
NGR	3,744	Rigid	10/5/2023
Starlinger	8,986	Flexi	1/11/2023
Huaxing	5,616	Flexi	1/12/ 2023*(tentative)

Overview of the Objective and Set-Up:

Table 6 : Plastic waste type targeted with the TTS PWRP

Additional Waste Categories Targeted	Plastic Type[5]
Rigid plastic	PP Thermoformed, PET Thermoformed, Polystyrene
Flexible plastic packaging	LDPE, HDPE, PP (including BoPP, woven and non-woven PP), multi-laminate packaging, PS.

[5] Details of Material type(s) managed by the project in line with the VERRA standard is provided under section 1.2.

TTS has three collection channels to source plastic waste:

1. Buyback centers (plastic waste sourced from waste collectors)
2. Material Recovery Facilities (commercial and residential waste)
3. Factory and manufacturing factories as Industrial Clients

TTS collects plastic waste from the sources above, which otherwise ends up in the environment. At dumpsites, open burning without energy recovery is common in Kenya's unsanitary landfills, contributing to air pollution and releasing greenhouse gases (GHGs) into the environment. Through its collection activities, the project reduces plastic waste entering open dumpsites and the environment. The collection sites are in Dandora, Kitengela, Mombasa, Mlolongo, and Thika. More sites are planned in the following years, which will have the same standard operating procedures. Collected plastics are taken to the TTS recycling facility for further sorting and processing at the Ehothia site.

Baseline scenario: Cities across East Africa are growing rapidly; however, the waste management infrastructure to manage the increasing waste does not yet exist. Current waste disposal methods are extremely harmful to human and environmental health: 92% of plastic waste produced in the Kenya region is mismanaged[6] and less than 10% of overall waste is recycled. Thus, the penetration rates of plastic waste collection and recycling activities are less than 20% within the host country.

East African waste management is under the jurisdiction of local authorities. However, most local authorities have not prioritized the establishment of proper waste management systems as the councils/local authorities lack technical, institutional and financial capacities to manage waste. One of the major challenges[7] is a lack of funding, which has affected investment in waste management facilities and equipment in the host country. This has led to the current poor state of waste management, which includes indiscriminate dumping, uncollected waste and lack of waste segregation across the country. On average, worldwide, open burning accounts for 60% of uncollected plastic garbage and 13% of plastic waste at dump sites. In the case of Kenya, around 56%[8] of the total amount of plastic waste is openly burnt, leading to air pollution.

In the past, TTS has worked to remedy the East African waste problem, but never to the extent of the TTS PWRP initiative. TTS was active only in mixed waste collection from households and businesses, sorting and composting. The plastics now targeted under TTS PWRP could not be managed as there were no recyclers or alternative waste

[6] https://plastichotspotting.lifecycleinitiative.org/wp-content/uploads/2020/12/kenya_final_report_2020.pdf, page 5.
[7] http://meas.nema.go.ke/pops/download/National-Solid-Waste-Management-Strategy-_2.pdf, section 2.4.
[8] https://plastichotspotting.lifecycleinitiative.org/wp-content/uploads/2020/12/kenya_final_report_2020.pdf, page 24.

technologies able to manage the plastic types at the time. Hence, these materials were taken to the dumpsite for disposal.

The TTS flexible plastic waste recycling plant is the largest in Kenya. Rigid and flexible plastics are recycled into pellets, which are sold to local manufacturers to replace virgin plastic.

1.10.1 Overview of Collection and Recycling Models:

TTS PWRP collection operations

The processes involved in the TTS PWRP are collecting mixed plastic waste from the three sources, and the transfer of this plastics waste to the TTS Recycling Instance's recycling site for sorting and final recycling.

TTS has three collection channels to source plastic waste:

1) Buyback centers: Plastic waste is purchased from waste pickers at TTS buyback centers located near major unmanaged dumpsites. The collected plastic waste is then baled and taken to the TTS recycling plant. There are 8 individual buy back centers currently operating and planned to be open on or before 31st December 2023. Each buy back center is considered as a collection activity and is uniquely marked as described in Table 4.

   Waste pickers deliver plastic waste to each collection trading point that has its own site administration and quality control procedures in place. At each site, a Quality Control Assistant reviews the plastic collected against the sample buying list. The same Quality Control Assistant undertakes monitoring procedures, measuring and recording the weight and type of the plastic waste in the delivery notes and in the monitoring sheets. The weight excludes the sacks/nets the waste is brought in.

2) MRFs: TTS collection services gather mixed waste from residential and commercial clients. Mixed waste is taken to TTS sorting sites. Using conveyor belts and other machinery, trained staff sort the incoming waste into more than 40 different waste fractions: paper, cardboard, plastic containers and packaging, styrofoam, glass, metal, aluminum, shoes, textiles, and many more. Staff engaged in sorting activities are provided with a list of criteria to help them identify the required materials to proceed for recycling. It is a two-stage sorting process, one in buy- back centers, and other in sorting sites, to get the accurate material. Most material is compacted for easier storage, transport, and processing. Organic waste is processed in TTS composting facilities. Plastic waste is sent to the TTS plastic recycling plant. Remaining materials (such as paper, metals, glass) are sent to the third-party recyclers, where they are processed into new raw materials. Organic

waste is processed in TTS composting facilities. Currently, 3 MRFs have been considered as individual collection activity instance.

3) Industrial Clients: TTS operates on site with various manufacturing clients across Kenya to collect their waste, including plastics. The plastic waste is taken directly to the TTS recycling plant. Each Industrial Client's facility acts as a collection activity.

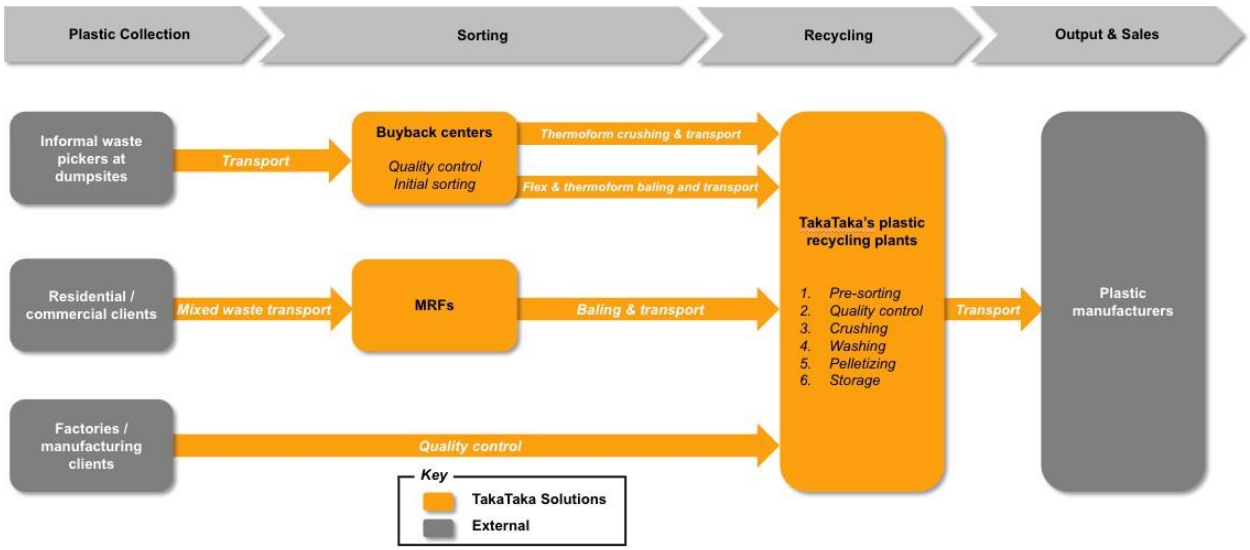


Figure 2: Flow of plastic waste through Taka Taka Solutions' operations





Above picture represents the collection activity in the collection sites.

TTS PWRP recycling operations

Once the specified additional plastic waste is collected (and sorted if necessary), it is transported to TTS recycling facilities. TTS has both a rigid and a flexible plastic washing line, along with pelletizing capabilities.

The TTS plastic recycling process (see below steps) is a mechanical one, first shredding and grinding incoming plastic for easier processing. The product is washed and dried to remove the impurities before being transformed into higher value plastic pellets. Plastic pellets are then sold to local manufacturers. At the TTS recycling site, plastic waste is monitored at each step of sorting, input to the washing line, and output of the pelletizer.

Leakage from the collection and recycling of plastic wastes are: Pre-sorting leakage, dirt and non-selected plastics, production waste leakage, sludge, these are taken to the landfill.



Figure 3: Flow of TakaTaka Solutions' Mechanical Recycling operations



1. Truck entering the recycling site



2. Sorters sorting the waste on the conveyor



3. Baling team bales the fractions



4. Flexible recycle plant



5. Rigid Plastic Recycling



6. Flakes



7. Pellets

Table 7 : Major Equipment List

Type	Equipment	Make	Capacity (kg/hr)
Rigid washing line	Crusher	Bortech	650
	Friction washer	Bortech	650
	Hot washer	Bortech	650
	Rinsing tank	Bortech	650
	Packing station	Bortech	650
	Sorting platform	Bortech	650
	Screw conveyors	Bortech	650
Flexible washing line (current)	No hot wash	GET Recycling	800
	Shredder	GET Recycling	800
	Storage silo	GET Recycling	800
	Squeezer	GET Recycling	800

	Crusher	GET Recycling	800
	Friction washer	GET Recycling	800
	Rinsing tank	GET Recycling	800
	Packing station	GET Recycling	800
	Sorting platform	GET Recycling	800
	Screw conveyors	GET Recycling	800
Flexible washing line (new)	No hot wash	Lindner Washtech	1,600
	Shredder	Lindner Washtech	1,600
	Storage silo	Lindner Washtech	1,600
	Squeezer	Lindner Washtech	1,600
	Crusher	Lindner Washtech	1,600
	Friction washer	Lindner Washtech	1,600
	Rinsing tank	Lindner Washtech	1,600
	Packing station	Lindner Washtech	1,600
	Sorting platform	Lindner Washtech	1,600
	Screw conveyors	Lindner Washtech	1,600
Pelletizers,	Pelletizer 1	Erema	250
	Pelletizer 2	Taiwan	400
	Pelletizer 3	NGR	500
Pelletizers,	Pelletizer 4	Starlinger	1,200
	Pelletizer 5	Huanxi	750

The operational life of project equipment is considered to be 25 years as per industrial practice.

1.11 Project Location (3.7)

The project location and geographic boundaries are designated in the KML files attached as part of this document. At present, the collection and recycling centers have the following project location and geographic boundaries

Table 8: Location and geographical boundaries of collection and recycling centers

Location	Latitude & Longitude	Project Activity Identifier
Dandora – Buyback center: Dandora is an eastern suburb in Nairobi, Kenya. It is part of the Embakasi division.	1° 15' 1.26" S 36° 53' 40.884" E	BB-01
Thika – Buyback Center: Thika is an industrial town and a major commerce hub in Kiambu County, Kenya, lying on the A2 road, 42 kilometers northeast of Nairobi.	1° 4' 37.992" S 37° 7' 2.604" E	BB-02
Kitengela – Buyback center: Kitengela is a municipality in the Kajiado County of Kenya, located 50 kilometers south of the capital Nairobi, forming part of the greater Metropolitan Area.	1° 29' 35.88" S 36° 58' 2.928" E	BB-03
Kisumu	0° 8' 8.1492" S 34° 47' 45.6792" E	BB-04
Mlolongo – Buyback center: Mlolongo is a city in Machakos County, Kenya. Its population was estimated at about 136,000 people in 2019.[9] It is a satellite city of Nairobi and is part of the Nairobi metropolitan area.	1° 23' 24.936" S 36° 58' 32.88" E	BB-05
Nakuru	0°16'42.8"S 36°02'25.3"E	BB-06
Kakuma	3° 46' 2.3808 34° 49' 20.8596	BB-07
Mombasa – Buyback center: The town is known as the white and blue city	3° 45' 8.64" S 39° 40' 1.344" E	BB-08

[9] https://www.citypopulation.de/en/kenya/eastern/machakos/1610__mlolongo/

in Kenya. It is the country's oldest and second-largest city, with a population of about 1,208,333 people according to the 2019 census.		
Ehothia – Material Recovery Facility co-located with separate flexible and rigid washing line and Mechanical Recycling unit	1° 08' 25.4" S 36° 43' 58.8" E	MRF-01
Lusigetti	1° 16' 39.954 S 36° 36' 15.044 E	MRF-02
IC-01	1° 21' 48.715 S, 36° 54"41.00 E	IC-01
IC-02	1° 14' 7.587 S, 36° 52' 30.652"E	IC-02

Industrial client names to be submitted separately*.

1.12 Conditions Prior to Project Initiation

1.12.1 General Conditions

The baseline scenario is the same as the general conditions existing prior to the project initiation. Please refer to Section 3.5 (Plastic Waste Collection and/or Recycling Baseline Scenario) below.

1.12.2 Social and Environmental Conditions

Environmental Impact

According to Plastic Pollution Policy Country Profile: Kenya[10]: 92% of waste is mismanaged (Paruta et al., 2020), i.e., improperly disposed of in a landfill. In fact, there are no collection services in rural areas, which leads to leakage into terrestrial and marine ecosystems (Paruta et al., 2020).

[10] https://nicholasinstitute.duke.edu/sites/default/files/projects/Plastic-Pollution-Policy-Country-Profile-Kenya.pdf

- In terms of plastic, an estimated 37,000 tonnes of plastic leaks into the ocean every year, of which 67% comes from urban centers (Paruta et al., 2020). The problem is projected to get worse: by 2060, plastic generation will be 1.9 million metric tonnes per year (Lebreton and Andrady, 2019).
- Plastic pollution poses a major global threat to humans and the environment. At the present rate of population growth under a business-as-usual model, plastics production is estimated to double within the next 20 years in Kenya (Lebreton, 2019).
- Open burning of mismanaged plastic waste in Kenya poses significant risks for human health (due to the release of noxious chemical substances such as dioxin and particulate matters) and directly contributes to climate change.

This is the result of both a lack of collection services in rural areas and leakage in urban areas. According to Eunomia (2018), only 27% of plastic waste is collected, of which only 8% is recycled, while the remaining 19% is disposed of in an unsanitary landfill, a location where most solid waste is disposed of. In the Kenyan context, there are no sanitary landfills that include proper ecological precautionary measures such as wastewater treatment or landfill sealing. In many cases, it cannot be distinguished whether the disposal site is a landfill or dumpsite.

Dandora landfill, which is in the heart of the Nairobi slums of Korogocho, Baba Ndogo, Mathare, and Dandora, and which covers approximately 30 acres, is the destination of about 850 tonnes of solid waste generated daily by Nairobi, a city with a population of about 6.5 million people. Despite being declared full in 1996, dumping continues on the landfill[11].

Economic and Social Impacts

Informal waste pickers undertake a fundamental role in Kenyan society. These workers collect waste from homes, offices, streets, bins and skips, and markets, working at waste transfer stations in impoverished communities as well as illegal and legal dumpsites. Those who work in communities do so for a small fee, often collecting waste from homes and businesses. Many waste pickers live rough in informal settlements or are homeless. Dumpsite workers and waste pickers make a living by recovering materials that they sell to recyclers. These informal workers operate in very toxic environments and are often shunned by society, leading to social exclusion and mental health problems. The TTS PWRP not only supports in mitigating the environmental impact, but also generates jobs, provides sustained income and

[11] https://www.unep.org/news-and-stories/story/smoking-nairobi-landfill-jeopardizes-schoolchildrens-future

improved working conditions for these impoverished communities. All staff are provided with safe operating equipment (e.g., personal protective equipment [PPE]) and training.

In addition, the TTS PWRP runs additional programs to support workers engaged in the project. This includes hosting a kindergarten for young children to play while their parents are at work. Such systems enable sections of Kenyan society, such as women and single parents who may otherwise struggle to find child care and flexible work, to be employed.



Figure 1: Burning of waste in Dandora Landfill causing air pollution



Figure 2: Garbage collectors sort reusable materials at the Dandora landfill site on the outskirts of Kenya's capital, Nairobi

Unmanaged plastic waste causes drastic impacts on the local environment. It makes the work of informal waste workers more laborious and dangerous with the plastic often contaminated by hazardous matter and the waste workers falling ill often. The air quality is negatively affected when plastic waste is burnt and releases large amounts of noxious fumes further harming the local atmosphere and releasing more GHG gasses. The soil and water in such dumpsites can be easily contaminated with leachate caused by such plastic waste dumps and the microplastics can accumulate throughout the soil causing dangerous health consequences for all organisms. This harms the local biodiversity as species tend to move away from disturbances caused by such unmanaged plastic waste dumpsites.

1.13 Compliance with Laws, Statutes and Other Regulatory Frameworks (3.1.3)

The TTS PWRP Instances complies with the environmental laws of Kenya. NEMA approves the project and provides the consent to operate with attendant licenses, based on the following conditions:

- The project does not threaten endangered species.
- The project has a positive impact on the environment.
- The project respects the rights of workers.

- Complies with laws of Kenya

The project's Licenses as issued from the Kenyan NEMA are proof of compliance with Kenyan laws and submitted.

Currently, the main law governing the environment in Kenya is the Environmental Management and Coordination Act, 1999 (EMCA) (Rev. Ed. 2018). Whilst EMCA has been instrumental in providing an enabling legal and institutional environment for the management of the environment, it has been unable to ensure that the country fully addresses present-day environmental challenges in the devolved system of government which is a feature of governance in Kenya. Various UNIDO/IUCN reports & public literature shared in above section 1. which has presented the poorly managed scenario of plastic waste collection/recycling in Kenya. Thus, it can be transparently depicted that the current situation of compliance rate in terms of collection & recycling rate of plastic waste is below 20% in the host country. Same has been elaborated in below section 3.5.

In Kenya, there was no mandatory EPR system regulated before the start date of the project. However, recently Kenyan government has come up with new regulations/bills discussed below:

Sustainable Waste Management Act 2022[12]. Enacted by President Uhuru Kenyatta and passed by the National Assembly on 23rd Feb 2022, the Law provides for the establishment of a Waste Management Board, mandatory extended producer responsibility programmes[13], recovery of household waste and the closure of illegal landfills in all 47 counties of the East African country. The Rules and Regulations for the same will be formulated and notified within 2 years from the date of Notification of the law, that is July 2022, therefore, currently while EPR exists as a direction, it is currently not in force yet.

Nonetheless, above regulations provide obligation for producer only and the TTS is not the producer but an independent private entity who is implementing this *plastic waste collection and recycling* project activity on voluntary basis. The impact of latest amendment bills and regulations would require monitoring and evaluation on annual basis, and it will take time and efforts to achieve the objective of the laws.

[12] http://www.parliament.go.ke/sites/default/files/2022-05/The%20Sustainable%20Waste%20Management%20Bill%20%28%20National%20Assembly%20Bills%20No.%2022%29%202021.pdf

[13] https://www.wwfkenya.org/faqs_on_epr_regulations_2021/

Thus, the project activity will provide strength in achieving the overall objective of the latest regulations.

1.14 Additional Information Relevant to the Project

Commercially Sensitive Information (3.2.2)

The Stakeholder Consultation Meetings list has been removed due to names and contact details being supplied.

Further Information

1) Environmental conditions of the project area

The TTS PWRP helps to improve the environment through the following activities:

- It reduces the presence of waste in the environment and landfills, reducing potential harm to fauna and flora.
- It promotes community management and raises awareness of waste and ecosystem management at a local and global level.

2) Socio-economic impact assessment

Socio-economic impacts of the project have been assessed by the TTS during the project design to ensure integrated benefit for communities and ecosystems.

The proposed activities have no significant negative social impacts. The project involves collectors and recyclers. To be successful, project activities were designed to respond to the local challenges and development perspectives of these collectors and recyclers.

Socio-economic benefits

The project's mission is to build an integrated waste management system that maximizes recycling at scale and provides women and youth with employment, education, and social resources and tries to achieve SDG 1, SDG 3, SDG 5 and SDG 8. Around 450+ staff are employed, of which 50% are female.

TTS contributes to the sustainable development of surrounding communities, offering social and economic benefits. This includes increased job opportunities and a boost in local and regional economies. The project creates a social impact of 300 direct jobs and 3,000 jobs created indirectly. Furthermore, as detailed in Section 1.12.2, the project creates additional jobs, provides sustained income to workers, and improves working conditions.

Furthermore, workers benefit from social programs run by the TTS PWRP, including access to the project's kindergarten for workers with young children.

TTS tracks job data through contracts signed for direct jobs, while indirect jobs are estimated based on waste quantities and survey data. TTS tracks social benefits through issuance records.

2 STAKEHOLDER ENGAGEMENT AND SAFEGUARDS

2.1 Stakeholder Engagement (3.13)

2.1.1 Stakeholder Identification (3.13.1)

As referenced in the Plastic Standard Section 3.13.3 Stakeholders are any individuals, non-governmental organizations, business associations or businesses or government entities who are either impacted or are involved in the TTS PWRP activities at any stage in the process, from recruitment of collectors to recycling processes.

Considering the objectives of the TTS PWRM, the chosen methods specifically focused on Identifying the relevant informal waste workers and their expansive networks based around the collection and recycling instance as the key stakeholders.

As only some informal waste workers are literate or possess a cell phone or access to the internet, a word of mouth approach was chosen to mobilise the maximum number of informal waste workers to participate and spread the notice in their networks.

Public notices were printed and put in spaces near the project collection and recycling instances with maximum public footfall to ensure the greatest coverage for the same. NGOs and Government organizations, businesses and business associations were contacted over on their regular communication channels to invite them for the process as stakeholders.

This is in line with the requirements of the stakeholder identification of VERRA Plastics Standard.

2.1.2 Stakeholder Description (3.13.2 – 3.13.3)

There are four key stakeholder groups relevant to this project :

1) Informal Waste pickers: The waste collectors are employed and paid to collect waste. All waste collectors are local to the buyback centers and also benefit from the cleaner local environment.

2) Recyclers: Recyclers are the local people who are employed in the recycling sites for sorting and recycling and who benefit from the healthy work environment.

3) Local community: The local population which is directly affected by project collection and recycling instances locations such as neighbours. These communities are usually not registered with a formal waste collection service provided by the government or other entity.

4) NGOs: NGOs such as the Kenya Association of Waste Recyclers, Trash Care Services, which care about the environment, waste collectors, and recyclers, are also impacted by the project.

2.1.3 Stakeholder Consultation (3.13.4 – 3.13.8)

Stakeholders identified in Section 2.1.2 were notified and will continue to be notified as part of the continuous communication and adaptive management of the project development process. As many of these collectors may be marginalized or vulnerable, the team works closely on the ground year-round. This means developing close relationships with each stakeholder; Moreover,at all the collection and recycling instance sites, the contact details of the TTS representatives are shared on the notice boards.





Informal waste workers and Formal waste workers communication session

All stakeholders are made aware of their invitation to evaluate and raise concerns about any potential negative impacts or to suggest desired outcomes of the project with the grievance mechanism and continuous communication plan.

A stakeholder consultation meeting was conducted in Nairobi on 5th August, 2022 in line with the requirement of Plastic Waste Reduction Standard. The Stakeholder's consultation process included face-to-face meetings with the identified stakeholders such as waste pickers, collectors, women's groups that collected, washed and sorted the plastic waste, and the day workers and was open to NGOs and Plastic Businesses and Manufacturing Associations along with local government officials who may raise any concerns at any point of time with the help of Grievance/Feedback Mechanism.

The TTS PWRP instance and issuance of plastic credits was explained to the stakeholders as well as the process in place to validate and expand the work performed by the stakeholders. Stakeholders were interviewed by the TTS team to better understand the work they do and how they have benefited by the collection of plastic waste in Kenya. Stakeholders were asked to provide feedback on how their collecting or recycling activities could be improved if plastic credits were issued and if there were additional financing for plastic collection and recycling operations. LSC was planned with special attention to women participation and was conducted at a location that was freely accessible to all stakeholders. This is not a static event, but rather a continuous engagement with stakeholders who are regularly reached out to.Stakeholder meetings are recorded by TTS, and everyone present signs the attendance records. All feedback is shared with the TTS representative who evaluates the impact, positively and negatively and from here assesses how this feedback can be used to improve the program. All stakeholders were happy and appreciated the TTS sustainable project activity and requested the development of more such infrastructures and projects to achieve the dual objective of environmental benefits and community social development.





Informal waste workers being invited for Local Stakeholder Consultation as stakeholders.





3 Pictures taken during local stakeholder Consultation

2.1.4 Free, Prior and Informed Consent (3.13.6)

No property rights are impacted by the TTS PWRP Instances as TTS obtains consent from those whose property rights will be affected by the project in the form lease licenses as per the law. TTS have a signed agreement with the owner of the land acknowledging that they permit the recycling activities to take place[14].

Additionally, a helpline number and email id are shared to register feedback at any point of time during the crediting period.

2.1.5 Continued Consultation and Adaptive Management (3.13.9)

As discussed in the original Local Stakeholder Consultation conducted, the TTS team is in constant contact and takes an adaptive approach to project management. Constant communication is maintained as the informal waste workers are an essential stakeholder influenced by the project. This includes communication of best practices, health checkups and safety counselling, PPE distribution and specific handling of plastic waste polymers among others, Therefore the TTS team remains in communication on the ground on an ongoing basis and a continuous feedback/grievance mechanism is maintained by TTS. These continuous feedback

[14] Lease Agreements.

and grievance modes include grievance registers maintained at all project sites of collection and recycling instances. This is supplemented by regular in person visits by the TTS team members for direct counselling. This is in line with written Standard Operating Procedures in practice by TTS. This is in line with the VERRA requirement.

The distribution of PPE kits,health checkups, best practices etc requires the TTS teams to reach out to guage the requirements of the informal waste workers through constant communication and continuous outreach to the informal waste worker community that TTS works closely with. Feedback is taken from the informal waste workers and incorporated into TTS activities including the types of polymers to source.

2.1.6 Anti-Discrimination (3.13.10)

TTS operates a strict anti-discrimination policy. Any entity wishing to become part of the program must work in line with the TTS Code of Conduct. Decisions about hiring, salary, benefits, training opportunities, work assignments, advancement, discipline, and termination must be based solely on the ability to perform the job, rather than based on personal characteristics or beliefs, such as race, national origin, gender, religion, age, disability, marital status, parental status, association membership, sexual orientation or political opinion.



Continuous outreach of informal waste workers

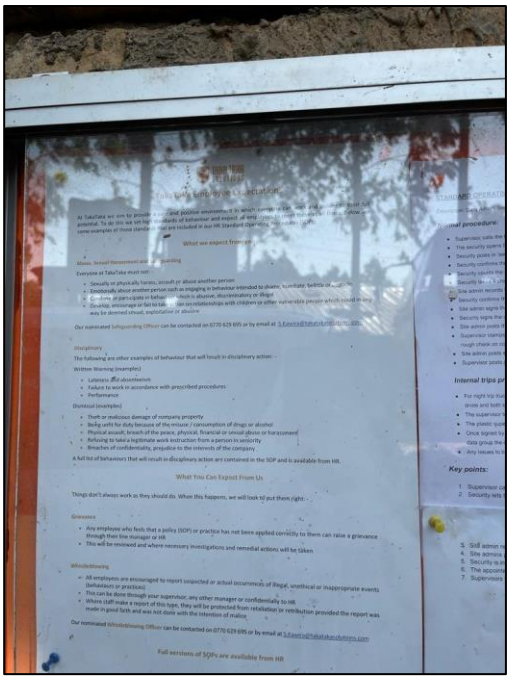
2.1.7 Feedback Grievance Redress Procedure (3.13.11)

As part of the written SOP for feedback and grievance redress procedure, all stakeholders involved in the project can give feedback directly to representatives of TTS via any of contact methods, which are shared publicly on the TTS website as well as at all the buyback centers and recycling sites. Communication is usually via in person written grievance or suggestion or over on email maintained on the TTS website or telephone.

For feedback directly related to TTS operations, TTS's grievance mechanism procedure is well established at each location and freely accessible for any stakeholder affected by project to register their issue for resolution. These are maintained on a register at the site location and maintained by the site in charge. This registry is clearly marked and easily identifiable for any stakeholder to access without confusion. The register is checked and directly reported to the head office for escalation and resolution done if any. Feedback or grievance may also be submitted directly over on email maintained on the webpage which is freely accessible or by telephone. All grievances are checked and resolved within 15 days of being registered.



Grievance Record at Project Collection Site Dandora



SOP for grievance registration mechanism at Ehothia Main Office

2.1.8 Feedback and Grievance Redress Procedure Accessibility (3.13.12)

TTS has freely shared the contact information on the TTS website[15]. TTS also gives out contact details via physical check in meetings as part of the continuous and adaptative communications, over on email on the website and telephone to all the communities and people that may be affected by the TTS project. which they can use to give feedback or convey grievances to TTS. This is maintained and advertised at all project activity instances and freely accessible and regularly checked by the TTS management team. The Stakeholders including the informal waste workers , waste workers employed at by TTS are made aware of the Grievance Redressal Mechanisms available , as referenced above, regularly throughout the continuous outreach that the TTS engages in. This was also discussed in depth during the Local Stakeholder Consultation.

2.1.9 Stakeholder Access to Project Documentation (3.13.13)

TTS operates on a transparent policy. While the Project Description and Monitoring reports are available via the Verra Registry as the project is registered under the Plastic Waste Reduction Standard v1.0.

All project documents and monitoring reports will also be made available at the project sites and head office through both linking to the online VERRA registry and physical copies of the documents for reference by any stakeholder. Any stakeholders will be directed there for information on the project.

2.1.10 Information to Stakeholders on Validation and Verification Process (3.13.14)

All relevant stakeholders were informed verbally and/or in writing about the upcoming verification and validation process used by the Plastic Program, and all relevant stakeholders had agreed to provide information and be cooperative in this process.

TTS representatives communicated to stakeholders at least five working days in advance of the site visit by the validation/verification body. TTS representatives will be available to facilitate on-site communication, or if the assessor wishes to communicate directly and independently with stakeholders then TTS will provide direct contact details to the assessor via email or phone.

2.2 Public Comments (3.13.15 – 3.13.18)

[15] https://takatakasolutions.com/contact/

No comments were received during the public comment period on the VERRA Registry.

2.3 Safeguards (3.14)

The program aims to reduce the amount of plastic waste that stays within the environment through the collection and recycling of as much plastic waste as possible to limit the impact on nature. The program aims to reduce the amount of waste incinerated in landfills. It aims to increase the production of plastic pellets, which can be used in place of virgin plastic.

Please refer to section Table 7 for the emissions reductions for the project as appended below.

2.3.1 Health and Safety (3.14.2 – 3.14.3)

- Potential health impacts as a result of the project activity in the project boundary:

  ✓ Negative health impacts may occur during the collection of the waste by the waste pickers. These are mitigated by receiving PPE. Uniforms, gloves, anti-dust masks, protective glasses, safety shoes and earmuffs. These help to ensure that each employee's health is protected, and limit exposure to risks.

- Potential hazards and safety risks associated with the implementation of the project activity:

  ✓ Potential hazards and risks may occur during the collection and recycling of the waste by rag pickers and the employees working in the recycling facility. Other health impacts include lifting loads, working with heavy machinery, and potentially hazardous waste materials in the workplace. Training is provided to employees to mitigate these risks.

  ✓ There are safety risks and toxic waste hazards that may occur during the collection of the waste by local collectors. These are best mitigated through training of the collectors about safe areas and methods to collect.




PPE distribution by TTS team for informal waste workers

2.3.2 Labor (3.14.4 – 3.14.8)

- TTS PWRP complies with labor and human rights laws and practices followed in the host country.

  ✓ TTS has written policies on compliance with relevant laws, compensation to project actors, and the prohibition of child labor in the project activity.

  ✓ The staff and laborers are not asked to work in conditions that directly impact their health, safety, or religious values. There will be no child labor involved in the project.

  ✓ This includes with the Kenyan Employment Act of 2007 and The National Social Security Fund (NSSF) Act, No.45 of 2013

- Increased recycling of plastic waste will lead to an increase in work and jobs.

  ✓ Disadvantaged communities already involved in the waste collection are the priority targeted beneficiaries of the project, hence mitigating potential social negative impacts as we do not enter into competition with local engaged stakeholders but instead work with them to incentivize them and support their efforts and working conditions.

2.3.3 Energy Efficiency and Greenhouse Gases (3.14.9 – 3.14.13)

The main source of GHG emissions is the energy consumption of machinery used in the recycling facilities and the transportation involved in the project activity. The recycling of collected plastics means that there are no emissions from the production of virgin plastics, while the open burning of plastic waste and the presence of plastics in landfills are reduced; therefore, these are considered as saved emissions. . Currently a solar PV system is installed in Ehothia campus to supply electricity for pelletiser machines.

Table 9 : TTS GHG emission reduction calculation

A.	Major source of GHG emissions because of project activity (Project Emission)
1	Electricity consumption in recycling of plastic waste
2	Transportation of plastic waste and recycled products
B.	**GHG emissions avoidance due to the project activity (Emission Saved)**
1	Open burning of plastic waste and the presence of plastics in landfills
2	Replacement of virgin plastic

Table 10 : Emissions Reductions

Year	Project Emission	Emission Saved	tCO_2e emitted – tCO_2 avoided (tonnes)
1	378	1771	-1393
2	1214	5867	-4653
3	1636	6370	-4733
4	1831	7040	-5209
5	2862	12236	-9375
6	3180	13577	-10397
7	3180	13577	-10397
Total	**9533**	**60439**	**-53879**

Detailed calculations are provided in the WCC WRC Excel Sheet attached aswith this JPD&MR under Tab GHG WCC and GHG WRC

2.3.4 Condition of Natural Resources (3.14.14 – 3.14.15)

- Air quality impacts because of the project activity in the project boundary:

✓ Impact on air: The project mechanically recycles all the Recycling Instance waste polymers and thereby diverts them from being openly burned. This avoids the noxious emissions while displacing the consumption of virgin plastic feedstock.

- Water quantity and quality impacts because of the project activity in the project boundary:

  ✓ Impact on water resources: The project operates a closed loop water management system with an onsite Sewage Treatment Plant. The water for which is sourced from the nearby river and is treated by the STP installed at Ehothia before being sent to licensed water treatment facilities for further treatment and discharge





Closed Loop Sewage Treatment Plant at Recycling Instance Ehothia

- Soil quality impacts as a result of the project activity in the project boundary:

  ✓ Impact on soils: As the project collects plastic waste ,and recycles the same, that would have otherwise persisted in the environment, soil pollution is abated that would have occurred had the project not collected and recycled the plastic waste.

- Biodiversity and ecosystem health impacts because of the project activity in the project boundary:

  ✓ Impact on biodiversity: plastic which would have persisted in the environment and bio accumulated, is diverted from environment and recycled thereby reducing impact on biodiversity on land. As project collects waste from

Mombasa which is located on the Kenyan coastline, the TTS project diverts ocean bound and ocean leakage of plastic waste as well.

✓ Reduced impact on threatened and endangered species as a reduction in ocean plastic debris reduces the risk of species dying as a result of pollution.

Thus, the project brings a positive impact on natural resources quality in and around the project boundary.

2.3.5 Additional Impact Certifications (3.14.16)

All of the positive social and environmental impacts of the project are quantified through the Plastic Waste Reduction Standard. Additional certification standards are not used.

3 APPLICATION OF METHODOLOGY

3.1 Title and Reference of Methodology (3.1.2)

PWRM0001 Plastic Waste Collection Methodology Version 1.1[16]

PWRM0002 Plastic Waste Recycling Methodology version 1.1[17]

3.2 Applicability of Methodology

Justifications of the choice of the methodology are provided below.

PWRM0001, version 1.1: The Methodology is applicable when all the following conditions are met:

Table 11: Applicability paragraph and its justification

Applicability Para	Justification
4.1.a,b	The TTS PWRP 13 Collection Instances comprising of single Buy Back centers, Material Recovery Facilities and Industrial Clients with

[16] https://verra.org/wp-content/uploads/2022/06/PWRM0001_Plastic-Waste-Collection-Methodology-v1.1.pdf

[17] https://verra.org/wp-content/uploads/2022/06/PWRM0002_Plastic-Waste-Recycling-Methodology-v1.1.pdf

	Informal Collection : Buy Back Centers which includes waste collection from secondary collection points and Through waste pickers from dumpsites, water bodies, and open land (PWRMP0001, Appendix 1) Formal Collection : MRF and Industrial Clients which includes collection from Resident Welfare Associations, industrial and commercial establishments (PWRM0001,Appendix 1)
4.2	The Collection Instance project activities listed (single and/or any combination of Buy Back Centers, MRFs and Industrial Clients) above are new activities carried out for the recovery & recycling of plastic waste under the Recycling Instance component of the TTS Recycling project at Ehothia. This is because the project's collection ownership is owned entirely by TTS with new facilities commissioned by leasing land and taking appropriate licenses from local municipalities.
4.3	The sources of the collected waste are clearly identifiable and are existing or potential sources of plastic waste that would have been left or dumped in the environment or openly burned in the absence of the project activity. This is demonstrated by using the PLASTEAX database as demonstrated with the Penetration Rate for Collection Instance. The UNIDO Sponsored- PLASTEAX tool and methodology aim to provide a baseline of plastic packaging waste management and leakage to ocean and waterways, by country. The results are polymer-specific and product-specific. PLASTEAX database contains the baseline assessment for more than 43 countries specifically Kenya (GIZ 2022[18]).
4.4	The collected waste is sorted by type, electronically weighed and transferred to the TTS mechanical recycling facility at Ehothia, under Recycling Instance, where it is processed into pellets and sold to plastic manufacturing facilities. This is corroborated with invoices and weighscale receipts from collection centers to Ehothia recycling facility owned by Taka Taka Solutions in accordance with PRWM0001.
4.5	The dry weight of the final output of collected plastic waste that reaches to TTS PWRP Collection Instance and Recycling instance

[18] https://www.giz.de/de/downloads/giz2022-en-benchmark-of-plastic-hotspotting-methodologies.pdf

	for mechanical recycling facility is directly measured and recorded. Evidence such as sales invoices generated by the project proponent or goods receipt notes generated by the plastic waste recipient are submitted.
4.6	The output of the collection activity is not used in any unauthorized, illegal or non-statutory activities within the project boundary. Payment invoices are recorded and used to verify that the collected waste goes to the recycling facilities.
4.7[i]	The waste material collected in the project activity is taken to an end-of-life facility defined as in the TTS PWRP Collection and Recycling Instances as a mechanical recycling facility where the collected waste is reprocessed into plastic pellets and/or flakes and sold to displace consumption of virgin plastic polymers.
4.8	The availability of plastic waste is demonstrated by defining the baseline scenario and penetration rate using the publically available PLASTEAX database for Kenya. The PLASTEAX database is a UNIDO Sponsored dataset that takes in publicly available data to arrive at
4.9	Plastic waste collection and recycling are negligible in scope due to a lack of formal waste collection services and coordinated government resources. As defined in the project eligibility, the plastic waste recovery is below 20% for all project polymers as demonstrated in the Penetration Rate calculations. The PLASTEAX database is the reference dataset along with peer reviewed and open source data.
4.10	Plastic waste collected in the project activity is taken to an end-of-life facility i.e the project's Recycling Instance comprised of mechanical recycling pelletisers.. Also, not recycled or is lost during the recycling process (e.g., due to contamination) is managed in a way that does not include dumping on open land, in water bodies and/or at dumpsites; open burning; or incineration without energy recovery. Contaminated plastic waste is either not accepted by the recycling facilities or is stored for later disposal by the authorized agency as per the relevant regulations. Records are maintained by the TTS.

4.11	The collected plastic waste is mechanically recycled/reprocessed into plastic pellets and/or flakes within the host country i.e. Kenya. Thus, transboundary movement of collected plastic waste does not occur between the countries.

PWRM0002, version 1.1: The Methodology is applicable when all the following conditions are met:

Table 12: Applicability paragraph and its justification

Applicability Para	Justification
4.1.a	The TTS PWRP Recycling Instance involves the installation and operation of new mechanical recycling facilities comprising of plastic pelletisers for the project's collected plastic waste under Collection Instance justified above.
4.2	Under the Collection Instance, the plastic waste is collected by informal waste workers from untreated landfills such as Dandora,Thika and Kitengala which are open dumpsites, apart from public areas, streets, near waterways, industries as well as through buyback centers as explained above in Section 3.2 Table 11. This is corroborated with the GPS tagged invoices issued to informal waste workers for purchases from the dumpsites.
4.3	The TTS PWRP Recycling Instance involves the installation and operation of new mechanical recycling facilities composed of plastic pelletisers for the project's collected plastic waste under Collection Instance as defined in Sec 3.2 Table 11.
4.4	The collected waste is sorted by type, weighed and transferred to a mechanical recycling facility at Ehothia, where it is processed into pellets and sold to plastic manufacturing facilities. The intent of sorting is to ensure that only relevant plastic waste enters the recycling process. It also aims to ensure increased efficiency of plastic waste recovery.

	The sorting process description include: a) the source of the plastic waste; b) the technologies and methods used to sort the plastic waste; c) a detailed description of the sorting criteria; and d) the expected material composition of output waste streams post-sorting.
4.5	The process involved in the recycling facility includes sorting of the material as per the material type and colour, washing to remove contamination from it and drying before entering into the recycling process. Thus, plastic waste intended for recycling is not mixed with hazardous materials or substances that could be unsafe.
4.6	The different types of plastic are recycled separately and the final output of the recycling facilities is measured and recorded. The plastic, after being recycled into pellets, is placed into clear bags for sale to plastic manufacturers for remanufacturing into plastic products for local consumption and displace virgin plastic. This is demonstrated by the final output table , signed production logs, invoices of sold recycled plastic pellets .
4.7	The quality of the recycled plastic waste allows it to be used as feedstock in the manufacture of recycled products, thereby displacing the use of virgin plastic. The recycled plastic pellets are sold in bags to manufacturers. All sales receipts are processed and stored.
4.8	The availability of plastic waste is demonstrated by defining the baseline scenario and using the most recent publicly available data on plastic waste.

4.9	TTS PWRP Recycling Instance does not include any depolymerization of sorted plastic waste streams. Only mechanical recycling process is followed.
4.10	As defined in the project eligibility criteria for additionality and demonstrated in the penetration rate calculation using PLASTEAX database the plastic waste recovery for all polymer fractions is well below 20%. The same is submitted. Currently there is no infrastructure to manage the plastic waste within the project geography. Therefore, the project activities do not compete with other collection activities. The availability of plastic waste is demonstrated by defining the baseline scenario and using the most recent publicly available data on plastic waste. Without the project activities, there would be mismanaged plastic waste, which would be at significant risk of entering the ocean. Thus, the TTS PWRP Recycling Instance does not divert plastic waste from any historically existing, legally recognized recycling activity. This is further substantiated by the Baseline Assessment Report prepared by the PP.
4.11	Plastic waste that enters the project recycling facility but is not recycled or is lost during the recycling process (e.g., due to contamination) is managed in a way that does not include dumping on open land, in water bodies and/or at dumpsites; open burning; or incineration without energy recovery. Contaminated plastic waste is either not accepted by the recycling facilities or is stored for later disposal by the authorized agency as per the relevant regulations. Records are maintained by the TTS and invoices for the same are submitted.
4.12	This grouped project activity does not involve any import from other countries. All plastic waste is fully traceable

Applicability of Tool: In line with the PWRM0001 & PWRM0002, Version 1.1.

Step 3b: Project Method – Investment Analysis, the latest approved versions of the methodological tools for demonstration and assessment of additionality and investment analysis must be used when applying this step.

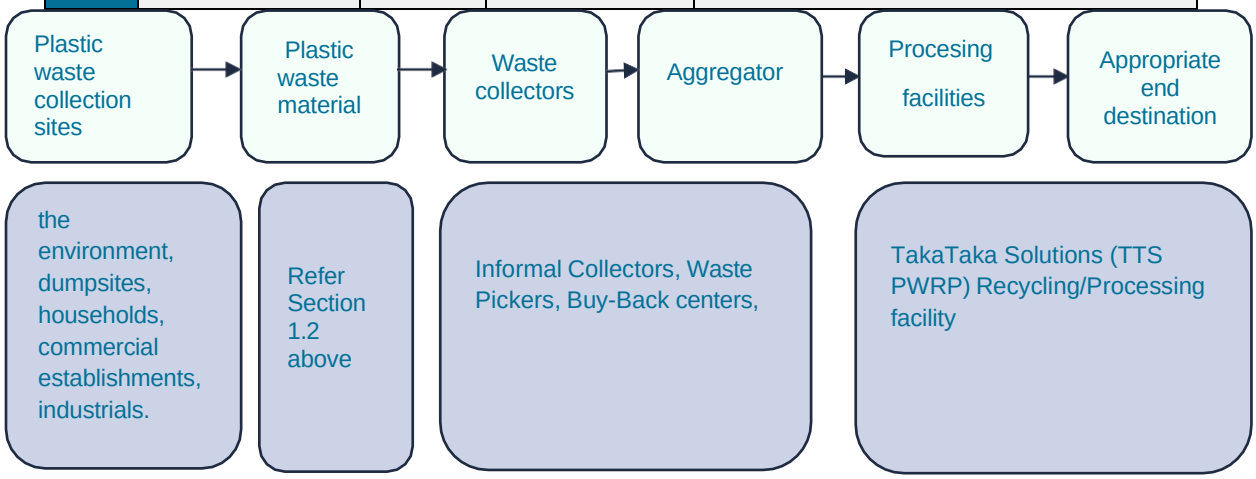
3.3 Project Boundary (3.8)

Table 13: Project Boundary

Source		Material Type	End-of-Life	Explanation
Baseline	Unregulated disposal sites	Other plastics (O)	General environment: public areas, streets, open dumpsites, unregulated and untreated landfill, open burning and leaking back into the environment, and incineration without energy recovery	Minimal to no collection activities depending on region. Plastic waste is mainly found in the environment. In Kenya, the landfill is an unsanitary landfill, regulated by the government, and the mismanagement rate is high, so, there is a chance of leakage of plastics back into the environment, and the incineration of waste is predominant in landfills, causing air pollution.
		PVC		
		PP		
		PET		
		HDPE		
		LDPE		
		PS		
	Environment	Other plastics (O)		
		PVC	Environment, possibly recycled or taken to a landfill	
		PP		
		PET		
		HDPE		
		LDPE		
		PS		

Source		Material Type	End-of-Life	Explanation
Project	Collection Instance i) Buy Back Centers ii) Material Recovery Facility iii) Industrial Clients	Other plastics (O)	-	-
		PVC	-	-
		PP	Collected and Recycled into pellets	Under Collection Instance 1 : Through single and combination of buy back centers ,MRFs and Industrial Clients, the collected polymers are diverted from the environment and sent to the Recycling Instance at Ehothia for mechanical recycling.
		PET	Collected and Recycled into pellets	
		LDPE	Collected and Recycled into pellets	
		HDPE	Collected and Recycled into pellets	
		Other plastics (O)	-	
	Recycling Instance P1,P2,P3,P4,P5 Pelletisers at Ehothia site	PVC	-	-
		PP	Collected and Recycled into pellets	Under Recycling Instance, the plastic polymers are sorted,washed,dried and weighed and through mechanical recycling,and then turned into pellets, and sold for manufacturing units. The plastics which are
		PET	Collected and	

Source		Material Type	End-of-Life	Explanation
			Recycled into pellets	collected but not recycled are sent to scientific landfills.
		LDPE	Collected and Recycled into pellets	
		HDPE	Collected and Recycled into pellets	



Project boundary diagram of collection methodology (PWRM0001)

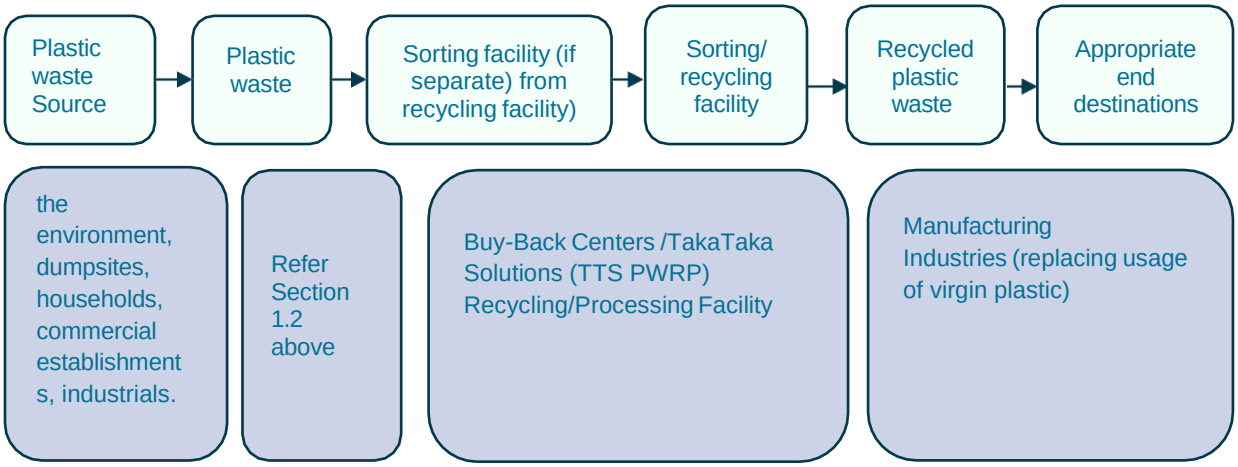


Figure 4: Project boundary diagram of recycling methodology (PWRM0002)

3.4 Project Region

The project operates in Kenya in the regions previously outlined in detail in the Section 1.11 with latitude and longitude of all Collection Instance Activities and Recycling Instance activities detailed.

3.5 Plastic Waste Collection and/or Recycling Baseline Scenario (3.9)

3.5.1 The overall situation of waste management in Kenya

In Kenya, waste management challenges include excessive plastic use and a lack of industrial waste treatment equipment and methods. Plastic waste currently constitutes a big challenge to solid waste management in the country. National Guidance for Plastic Pollution Hot spotting and Shaping Action, 2020 Report[19] for Kenya reveals that 92% of plastic waste produced in the Kenya region is mismanaged and less than 10% of the plastic waste is recycled.





[19] https://plastichotspotting.lifecycleinitiative.org/wp-content/uploads/2020/12/kenya_final_report_2020.pdf, page 5.





Polymer Type	Waste produced in country	Domestic recycling of collected	Export of collected	Properly disposed	Improperly disposed	Uncollected	Tot	Collected	Mismanaged	Leaked	Waste produced and imported	Domestic recycling incl imported
PET	44	10%	3%	0%	21%	66%	100%	34%	87%	12%	44	11%
PP	109	5%	1%	0%	19%	74%	100%	26%	94%	9%	110	6%
Polyester	113	0%	0%	0%	23%	77%	100%	23%	100%	5%	113	0%
LDPE	53	15%	2%	0%	18%	64%	100%	36%	83%	10%	53	16%
HDPE	52	19%	2%	0%	16%	63%	100%	37%	79%	8%	53	20%
PS	5	0%	0%	0%	18%	82%	100%	18%	100%	8%	5	1%
Other	69	4%	1%	0%	18%	77%	100%	23%	95%	5%	69	4%
Synthetic Rubber	24	8%	0%	0%	21%	71%	100%	29%	92%	7%	24	8%
PVC	35	1%	0%	0%	13%	86%	100%	14%	99%	4%	35	1%
All	503	7%	1%	0%	19%	73%	100%	27%	92%	7%	506	7%

Kenya Plastic Waste Detailed Share by Polymer[20]

Archetypes	Population 2020	Generated t	Collected t	Collected for recycling t	Properly disposed t	Improperly disposed t	Uncollected t	Mismanaged t	Leaked t	Generated kg/hab	Collected for recycling kg/hab	Mismanaged kg/hab	Share of collected	Share of mismanaged
Mombasa	665449	19915	14275	3799	0	10475	5641	16116	1010	29.9	5.7	24.2	72%	81%
Kisumu	400942	11999	4231	2289	0	1942	7768	9710	498	29.9	5.7	24.2	35%	81%
Nakuru	846194	25324	14053	4831	0	9222	11271	20493	1204	29.9	5.7	24.2	55%	81%
Nairobi	4782357	143124	85736	27305	0	58430	57388	115818	11582	29.9	5.7	24.2	60%	81%
Urban other	3903692	116828	23366	0	0	23366	93462	116828	9210	29.9	0.0	29.9	20%	100%
Rural	43535850	185577	0	0	0	0	185577	185577	11634	4.3	0.0	4.3	0%	100%

Waste Management by Geographical Archetype[21]

Poor plastic waste management contributes to poor air quality, ocean toxicity, and ecosystem disruption. Plastic is poisonous and some of its ingredients such as bisphenol-A and phthalates have been proved to cause cancer, birth defects, impaired immunity, endocrine disruption, and other ailments[22]. Living near dumpsites,

[20] https://plastichotspotting.lifecycleinitiative.org/wp-content/uploads/2020/12/kenya_final_report_2020.pdf, page 75.
[21] https://plastichotspotting.lifecycleinitiative.org/wp-content/uploads/2020/12/kenya_final_report_2020.pdf, page 76.
[22] http://www.greenbeltmovement.org/

such as the Mwakirunge dumpsite in Mombasa, has been linked to serious illnesses like malaria, diarrhea, and infections of the respiratory system. Most of this trash ends up as environmental litter, and is washed by rainwater into the Indian Ocean, while some of it clogs drainage systems.[23]

Kenya's population is estimated to be around 56 million people. The metropolitan area around Nairobi, which mostly encompasses the counties of Kiambu and Machakos, has a population of up to six million people; Nairobi itself has a population of roughly 4.6 million (UN Habitat, 2019). Mombasa, the second largest city in Kenya, has a population of over one million people and is a major commercial and logistical hub, as evidenced by its role as the principal port for several East African countries. The trash generation statistics reflect Kenya's features as a fast-developing country. On average, 0.39 kilograms of garbage are generated per capita every day, compared to 2.7 kg in Germany (OECD, 2017; World Bank, 2018). In the Greater Nairobi areas, Kenya's political and economic hub, 3,000 mt or 0.64 kg per capita of municipal waste occurs daily from residential areas, industry, and other private companies as well as public institutions (UN Habitat, 2019), a slight increase since the estimates by JICA (2010). According to JICA (2010), plastic fractions account for 9.5%. Recent data collection carried out by UN-Habitat (2019) assumes plastic content in a range of 9% to 15%, specified as per different income levels in Nairobi; countrywide data is not available. Lower-income areas count relatively lower volumes of plastics. On the other hand, high-income areas account for the highest volumes of plastics. Middle-income areas are, by far, the most relevant areas in terms of the absolute volume of plastics in municipal solid waste. Due to its function as the economic and political hub, a significant number of Kenya's high-income areas are concentrated in Nairobi. Putting all these findings together, plastics account for the largest share of municipal solid waste after organic waste and paper. These volumes predominantly originate from plastic packaging including traded and locally manufactured goods (Eunomia, 2018).

The Kenyan economy's expanding industrialization exacerbates this tendency. Despite the presence of waste management laws and rules, inadequate implementation and practices have resulted in towns and cities becoming overrun by their trash, consequently affecting public health and the environment. Most municipal governments have not placed a high priority on the construction of proper waste management systems, dedicating limited resources to their administration. Furthermore, the councils have lacked waste management technical and institutional capabilities. This has resulted in the current state of waste management in the country,

[23] A detailed study of plastic waste management in one of the slums in Mombasa, Kenya is found here: A case study of muoroto slum, Mombasa, Kenya.

which includes indiscriminate dumping, uncollected waste, and a lack of waste segmentation. This project is the **first recycling plant** in Kenya for flexible waste polymers and single-use plastics (trays, cups, etc.), demand for previously unrecyclable single-use plastics in Kenya for recycling is in line with Vision 2030 and the new circular economy Waste Management Bill[24].

Kenya does not currently produce virgin plastics. The sole facility that might conceivably turn raw materials into plastic base goods – a crude oil refinery in Mombasa – has been shut down for years. To be used in plastics, the (limited) indigenous crude oil must be processed elsewhere.

Waste transportation is largely rudimentary, using open trucks, hand carts, and donkey carts, among others. These poor transportation modes have led to littering, making waste an eyesore, particularly plastics in the environment. Disposal of waste in the country remains a major challenge as most counties lack proper and adequate disposal sites. The few towns that have designated sites practice open dumping of mixed waste as they lack appropriate technologies and disposal facilities. To address this situation, NEMA directed all county governments to designate areas of waste disposal and undertake basic actions to manage the sites, including fencing, manning, and weighing the waste[25].

The current waste management practices in Kenya can be described as nascent. The current deficiencies have historically grown and are based on a combination of political, economic, social, and technical factors. The current waste management system is evolving significantly and needs concerted action from different government levels and private companies as well as civil society.

Thus, the baseline scenario for the TTS PWRP is that in which, "without project implementation, the plastic waste would have remained in the environment, been disposed of by open burning, been incinerated without energy recovery and/or disposed of in a dumpsite and the plastic waste would not have been recycled" to replace the usage of virgin plastic.

In 2022, the TTS PWRP Instances would collect 1,518 tonnes of plastic from 13 Instances and as such recycle 260 tonnes of valuable pellets for plastic manufacturers from recycling instance 1 at Ehothia With plastic credits, the project will be able to increase this amount threefold and significantly increase the amount of plastic collected and recycled in Kenya.

[24] Kenya's circular economy model

[25] https://www.businessdailyafrica.com/bd/data-hub/garbage-pain-grows-as-dumping-tops-green-collar-crimes--2200512

3.6 Additionality (3.10)

As explained in the baseline scenario above, it is evident that plastic waste is highly mismanaged in the host country. The areas considered for the project activity is that the waste collection and recycling system is deficient, ill-equipped, and shows very low levels of collection and recycling. The communities and local authorities lack financial resources and equipment as well as economic incentives to develop and maintain a proper waste collection and recycling system.

Without the project activities, these volumes of plastics would not be collected and would remain in the environment or landfill. Public and private players do not have the sufficient technical and financial means to tackle the plastic issue at scale, so there is a need to invest in an incentive to help these remote and disadvantaged communities manage the problem by launching or reinforcing the plastic recovery and recycling supply chains at local and regional levels. The penetration and promotion of such management activities are key to improve waste management and to provide socioeconomic benefits to the community, while addressing the global environmental impact of plastic pollution and the overall socioeconomic benefit of community. The finance received from plastic credits will thus support the operational cost and the expansion of collection and recycling activities. The current Recycling Instance is a new activity and is not undergoing registration on any other eligible Standard or Plastic Credit Financing.

a) Demonstration of collection additionality through PWRM0001 V1.1:

Based on the PWRM, collection additionality can also be demonstrated from the following:

Step 1: As the Sustainable Waste Management Act was notified in July 2022 and within Part III it's Regulations to be published 2 years from date of notification, there are no regulations that enforce the collection of the relevant material type(s) or the laws or regulations are not systematically enforced and noncompliance is widespread in the relevant country or region. In line with the Sustainable Waste Management Act, the monitoring will occur subsequent to the notification of the Regulations of the same law.

Proceed to Step 2 (Outcome 1: Project Instance is a voluntary activity, and no laws enforce the implementation of the activity.)

Step 2: Activity Method – Positive List:

Outcome 2: The project activity is not included in the positive list. Proceed to Step 3a (penetration rate).

Step 3a: Project Method – Penetration Rate of Collection Activities

The penetration rate (percent) is given as the ratio between plastic waste collection (tonnes/year) and plastic waste production (tonnes/year) in the region. If this penetration rate is below 20%, the project activity is additional.

Any data or studies used in Step 3a to determine the penetration rate must be no more than three years old at the time of validation. The National Guidance for Plastic Pollution Hot spotting and Shaping Action, Final Report December 2020[26] states that the penetration rate of recycling activities is less than 20%. Specifically, 8% of total collected plastic waste recycled in the host country and 92% of plastic waste remains unmanaged (i.e., 73% uncollected and 19% improperly disposed). This applies to all plastic waste types in Kenya. Thus, the project activity is additional.

Penetration rate is found by using the below formula, as per the methodology, PWRM0001 V1.1

5) The penetration rate (%), which is the ratio between annual plastic waste collection and plastic waste generation, must be determined using the following equation:

$$Penetration\ Rate = \frac{C}{G} \times 100$$

(Equation 1)

Penetration rate =

Annual plastic waste collection (C)/ Annual Plastic Waste Generated (G) * 100

Penetration rate = C / G * 100

Table 14 : Collection instance Penetration Rate

Polymer Type	"G" Waste Generation (tonnes per annum)	"C"Total Plastic collected (Tonnes per annum)	Penetration Rate (=C/G*100)	Additional
LDPE (Rigid + Flex)	30200	5738	19	Yes

[26] https://plastichotspotting.lifecycleinitiative.org/wp-content/uploads/2020/12/kenya_final_report_2020.pdf, page 75.

PP	32800	4920	15	Yes
HDPE Flex*	7400	150.0	2	Yes
PET	82600	7434	9	Yes
PS	3200	96	3	Yes
EPS	300	9	3	Yes

Source of data : PLASTEAX 2019 database for Kenya

Please note :

For each of the Table 14 polymers, the values for collection and generation were taken from PLASTEAX 2019 database for Kenya columns for Collection, Mismanaged and Recycled.

For HDPE Flex, additionality is derived separately based on HDPE Flex collection figures from PLASTEAX 2019 Database for Kenya and submitted with this JPD&MR as part of WCC/WRC Calculation Sheet

Outcome: the project activity has a penetration rate less than 20%. Thus, the project activity is additional.

Demonstration of recycling additionality through PWRM0002 Versions 1.1:

Step 1: Regulatory Surplus:

As explained in the above sections, there are no laws or regulations that enforce recycling of the relevant material type(s) or the laws or regulations are not systematically enforced and noncompliance is widespread in the relevant country or region. Proceed to Step 2 (Outcome 1).

Step 2: Activity Method – Positive List

The project activity is not included in the positive list. Proceed to Step 3a (penetration rate).

Step 3a: Project Method – Penetration Rate of Recycling Activities

Total generation (G, tonnes/year), and recycling capacity of plastic waste (C, tonnes/year) in the region:

The official or public data for generation and recycling capacity of plastic waste material type focused by TTS PWRP in Kenya is not readily available, therefore PLASTEAX 2019 Database for Kenya and the UN Hotspotting guide, is used to find the generation and recycling capacity of plastic waste for the material types focused by TTS, and the same is presented below. Survey

report will be submitted to VVB in due course of the validation . The result of the analysis is provided below.

6) The penetration rate (%), which is the ratio between the total installed recycling capacity and total plastic waste generation, must be determined using the following equation:

$$Penetration\ Rate = \frac{C}{G} \times 100$$

(Equation 1)

Penetration rate is found by using the below formula, as per the methodology, PWRM0002 V1.1

Penetration rate = C / G * 100

Table 15 : Recycling Instance Penetration Rate for Polymers Covered by TTS

Polymer Type	"G" Plastic Waste Generation (tonnes per annum)	"C"Total installed Recycling Capacity (Tonnes per annum)	Penetration Rate (=C/G*100)	Additional
LDPE	30200	4832	16	Yes
PP	32800	4264	13	Yes
HDPE (flex)	7400	340	4.6	Yes
PET	82600	5782	7	Yes
PS	3200	0	0	Yes
EPS	300	0	0	Yes

Source of data : PLASTEAX 2019 database for Kenya.

The source of table 15 data is the Columns P and Q of the PLASTEAX 2019 database for Kenya.

Outcome: the project activity has a penetration rate of less than 20%. Thus, the project activity is additional.

3.7 Methodology Deviations (3.15)

There are no methodology deviations.

4 ESTIMATED COLLECTED AND/OR RECYCLED PLASTIC WASTE

4.1 Baseline Collected and/or Recycled Plastic Waste

The baseline plastic waste collection is the amount of plastic waste that would have been collected in the absence of the project activity.

Recovery:

From PWRM0001, the baseline is calculated as:

$$B_{collected,d,y} = \sum_{i=1}^{n} B_{collected,i,d,y}$$

(Equation 2)

Where:

Bcollected, d, y = Total baseline plastic waste collection transferred to destination d in year y (tonnes), where d is an appropriate end destination

Bcollected, i, d, y = Amount of material type i collected in the absence of the project activity and transferred to destination d in year y (tonnes), where d is an appropriate end destination. Where material collected is not identified by type, this represents the total plastic waste collected in the absence of the project activity and transferred to destination d in year y (tonnes).

The baseline plastic waste collected was determined as follows:

Since it is a new activity in all collection sites, Bcollected, d, y = 0

Recycling:

According to the PWRM0002, the Baseline for TakaTaka Solution will be calculated as:

$$B_{recycled,y} = \sum_{i=1}^{n} B_{p,recycled,i,y} \times AF_i + \sum_{i=1}^{n} B_{dp,recycled,i,y} \times MF$$

(Equation 2)

Where:

Brecycled,y = Baseline amount of recycled plastic waste in year y (tonnes)

Bp, recycled,i,y = Baseline amount of recycled plastic waste of material type i in year y (tonnes) without depolymerization

AFi = Adjustment factor for composite material i; for non-composite materials, this factor is equal to 1.

Bdp,recycled,i,y = Baseline amount of recycled plastic waste in the form of depolymerized plastics from material type i in year y (tonnes). Since the material type can no longer be determined based on the output, it must be determined based on the input to the depolymerization process, using a mass balance approach.

MF = Mass fraction of the output of the depolymerization process used for plastic production

The baseline recycled plastic waste for material type i was determind as follows:

Since, this is a new activity, the baseline is equal to 0 kg/year.

Hence, $B_{recycled,y} = 0$.

4.2 Project Collected and/or Recycled Plastic Waste

According to the PWRM0001, the project plastic waste collected is calculated as

$$P_{collected,d,y} = \sum_{i=1}^{n} P_{collected,i,d,y}$$

(Equation 3)

follows:

Where:

$Pcollected,d,y$ = Total plastic waste collected by the project activity and transferred to destination d in year y (tonnes), where d is an appropriate end destination.

Estimated Annual Average Collection : 20691 tonnes/year

For monitoring period the Pcollected,d,y is : 1518 tonnes (Table 17)

$Pcollected,i,d,y$ = Amount of material type i collected by the project activity and transferred to destination d in year y (tonnes), where d is an appropriate end destination. Where material collected is not identified by type, this represents the total plastic waste collected by the project activity and transferred to destination d in year y (tonnes).

According to the PWRM0002, project plastic waste recycled is:

$$P_{recycled,y} = \sum_{i=1}^{n} P_{p,recycled,i,y} \times AF_i + \sum_{i=1}^{n} P_{dp,recycled,i,y} \times MF$$

(Equation 3)

Where:

$P_{recycled,y}$ = Total amount of plastic waste recycled by the project activity in year y (tonnes)

$P_{, recycled,i,y}$ = Amount of plastic waste of material type i recycled by the project activity in the year y (tonnes) without depolymerization.

AF_i = Adjustment factor for composite material i; for non-composite materials, this factor is equal to 1

MF = Mass fraction of the output of the depolymerization process used for plastic production

Estimated annual average for Precycled,y : 11888 tonnes/year

Monitoring Period Precycled,y : 260 tonnes/year

NOTE on Adjustment Factor AF_i: TakaTaka solution recycles and counts only non-composite materials as there is a pre-sorting process. This means that AF_i = 1 for recycling activities.

4.3 Net Collected and/or Recycled Plastic Waste

The net plastic waste collected is the amount of plastic waste collected by the project activity that would not have been collected without project implementation.

Net plastic waste collection is calculated as follows from PWRM0001:

$$N_{collected,y} = \sum_{d=1}^{m} P_{collected,d,y} - B_{collected,d,y}$$

(Equation 4)

According to the PWRM0002, net recycled is:

$$N_{recycled,y} = P_{recycled,y} - B_{recycled,y}$$

(Equation 4)

Where: $Nrecycled,y$ = Net recycled plastic waste in year y (tonnes)

Since it is a new project, the baseline is 0, so the net collected and recycled plastic waste is the same as in Section 4.2.

Table 15a: Net Project Collected Plastic Waste (all 13 collection instances) *

Year	Estimated baseline collected plastic waste (tonnes)	PET Collected (Tonnes)	PP Collected (tonnes)	HDPE Collected (tons)	LDPE Collected (tonnes)	PS	EPS	Total Estimated project net collected plastic waste (tonnes)
Year 1	0	71	1495	226	591	0	0	2383
Year 2	0	181	3793	574	1500	0	0	6048
Year 3	0	641	13397	2029	5299	0	0	21366

Year 4	0	739	15458	2342	6114	0	0	24653
Year 5	0	838	17519	2654	6929	0	0	27940
Year 6	0	936	19579	2966	7744	0	0	31225
Year 7	0	936	19579	2966	7744	0	0	31225
Total	0	4342	90820	13757	35921	0	0	144840

Table 15b: Net Project Recycled Plastic Waste for Recycling Instance 1*

Year	Estimated baseline recycled plastic waste (tonnes)	PET Recycled (tonnes)	PP Recycled (tonnes)	HDPE Recycled (tonnes)	LDPE Recycled (tonnes)	PS	EPS	Total Estimated project net recycled plastic waste (tonnes)
Year 1	0	0	954	268	109	0	0	1331
Year 2	0	101	2421	678	276	0	0	3476
Year 3	0	357	8550	2396	977	0	0	12280
Year 4	0	412	9865	2765	1128	0	0	14170
Year 5	0	467	11180	3134	1278	0	0	16059

Year 6	0	522	12495	3503	1429	0	0	17949
Year 7	0	522	12495	3503	1429	0	0	17949
Total	0	2381	57960	16247	6626	0	0	83214

*i)Please refer to Appendix 8.7 to Appendix 8.8 for detailed and full breakdown for instance wise and material type breakdown.

ii)For all the polymers, including PS, EPS and PET listed, the actual figures collected and recycled would be based on actuals during the respective monitoring periods.

5 MONITORING

Data / Parameter	$B_{collected,d,y}$
unit	Tonnes/year
Description	Amount of plastic waste collected in the baseline and transferred to destination d in a year.
Equation	PWRM0001, version 1.1.: Equation 2
Value	0
Source of data	Measured or calculated on a dry basis, or external source(s) of data (e.g., primary surveys, third-party literature)
Justification of choice of data or description of measurement methods and procedures applied	Baseline plastic waste collection is zero for new project activities
Purpose	Determination of plastic waste collection for new activities
Comments	-

5.1 Data and Parameters Available at Validation (3.12)

Baseline plastic waste collection parameter (new activity):

Baseline recycling parameter (new activity):

Data / Parameter	$B_{recycled,d,y}$
Data unit	Tonnes/year
Description	Amount of material type i recycled in the baseline in year y
Equation	PWRM0002, Version 1.1: Equation 2
Value	0
Source of data	Based on historical data of recycled material type i or established in a reasonable and conservative manner
Justification of choice of data or description of measurement methods and procedures applied	Baseline plastic waste recycling is zero for new project activities
Purpose	Determination of baseline scenario
Comments	-

5.2 Data and Parameters Monitored (3.12)

For collection/recovery:

Data / Parameter	$P_{collected,d,y}$
Unit	Tonnes/year
Description	Amount of plastic waste collected by the project activity and transferred to destination d in year y
Equation	PWRM0001, Version 1.1: Equation 3
Value	20691
Source of data	Measurement on a dry basis at the collection site/facility and/or at the end destination

Description of measurement methods and procedures applied	Measurement of collected plastic waste is carried out using weighing machines, and the data is documented in the logbook, provided with the goods receipt.
Frequency of monitoring/recording	Recorded every time collected material is sent from the project site/facility to the appropriate end destination
Quality Assurance/Quality Control (QA/QC) procedures to be applied	Weighbridges are calibrated according to the equipment manufacturer's specifications or at least every three years.
Purpose	Calculation of project's collected plastic waste
Comments	-

For recycling

Data / Parameter	Sorting output
Data unit	Tonnes/year
Description	Quantity of sorted plastic waste of each material type i in year y.
Equation	-
Value	-
Source of data	On-site measurement (log books/records)
Description of measurement methods and procedures applied	Measurement of each material type i with weighing scales after sorting of waste and the data is documented in the logbooks
Frequency of monitoring/recording	Recorded at the time of sending each batch of sorted plastic waste from the sorting facility to the recycling facility

Quality Assurance/Quality Control (QA/QC) procedures to be applied	Weighbridges are calibrated according to the equipment manufacturer's specifications or at least every three years
Purpose	Calculation of project collected and/or recycled plastic waste
Comments	No hazardous materials are found during the sorting activity. The same can be confirmed during the site visit during the audit at the validation and verification stages.

Data / Parameter	Recycling input
Data unit	- Dimensionless
Description	List of input materials (e.g., solvents, process fuels) to the recycling process. This includes the category of plastic waste of material type i and any other material(s) used in the recycling process in year y.
Equation	-
Value	-
Source of data	Material type and the quantity of plastic waste before entering the recycling facility is recorded in on-site records (log books/records).
Description of measurement methods and procedures applied	Weighing machines are used to weigh the plastic waste before sending as a recycling input and the data is recorded in the logbook.
Frequency of monitoring/recording	Recorded prior to each batch of sorted plastic waste entering the recycling process
Quality Assurance/Quality Control (QA/QC) procedures to be applied	Scales shall be calibrated according to the equipment manufacturer's specifications or at least once every three years. Hazardous material is not a part of the recycling activity. The same can be cross verified from the project reports and Quality control reports.

Purpose	Monitoring for compliance with Applicability Condition 5 in Section 4 of PWRP0002, v1.1
Comments	-

Data / Parameter	$P_{r\text{recycled},i,y}$
Unit	Tonnes/year
Description	Amount of plastic waste of type i recycled by the project activity in year y (tonnes)
Equation	PWRM0002, Version 1.1: Equation 3
Value	11888
Source of data	Direct measurement at project facility using weighing scales, the data is documented in the logbooks.
Description of measurement methods and procedures applied	Measurement of each material type i with weighing scale after the final stage at the recycling facility, before leaving the project site or being used for manufacturing products onsite
Frequency of monitoring/recording	Recorded prior to each batch of recycled plastic waste leaving the recycling facility.
Quality Assurance/Quality Control (QA/QC) procedures to be applied	Scales shall be calibrated according to the equipment manufacturer's specifications or at least every three years. The amount of plastic recycled shall be cross-checked with sales receipts of the material sold to the final buyer or another equivalent third-party evidence.
Purpose	Calculation of project recycled plastic waste
Comments	Only the dry weight of the plastic waste is noted. And only the material types for which recycling activities are

	determined to be additional at validation are included for crediting.

Data / Parameter	AFi
Unit	-
Description	Adjustment factor for composite material i
Equation	Equation 3
Value	Not applicable as the material used not contains composite materials.
Source of data	Default factors listed in Table 2 of the methodology PWRM0002, Version 1.1 that correspond to the composite materials recycled
Description of measurement methods and procedures applied	Apply the default factors listed in Table 2 of the methodology PWRM0002, Version 1.1 that correspond to the composite materials recycled.
Frequency of monitoring/recording	-.
Quality Assurance/Quality Control (QA/QC) procedures to be applied	-
Purpose	Calculation of project recycled plastic waste
Comments	-

For non-recycled plastic waste

Data / Parameter	End destination of non-recycled plastic waste End destination of non-plastic waste from recycling facility

Unit	- Dimensionless
Description	End destination of plastic waste that enters the project recycling facility and is not recycled or is lost during the recycling process in year y (tonnes). End destination of waste (other than non-recycled plastic) produced by the recycling activities of the facility. This includes any waste segregated at the sorting stage that is not used as an input to the recycling activity (if sorting is within the recycling facility) and any waste coming out of the recycling process.
Equation	
Value	-
Source of data	Direct measurement at project facility/third-party evidence (e.g., receipts).
Description of measurement methods and procedures applied	Measured and calculated
Frequency of monitoring/recording	Total amount of non-recycled plastic waste will be reported annually.
Quality Assurance/Quality Control (QA/QC) procedures to be applied	N/A
Purpose	Monitoring of how much plastic waste collected could notrecycled at the end of life of the same is ensuredRecycled and the end of life of the same is ensured.
Comments	-

5.3 Monitoring Plan (3.12.3 – 3.12.5)

1) The methods for measuring, recording, storing, aggregating, collating, and reporting data and parameters (including, where relevant, the procedures for calibrating monitoring equipment):

   All the collected and recycled volumes are monitored regularly by TTS representatives and the standard operating procedures are explained in Section 1.10.

2) The organizational structure, responsibilities, and competencies of the personnel that will be carrying out monitoring activities:

   Monitoring is done by trained project personnel, understanding the importance of accurate data collection. Frequent training ensures that all technicians have a similar approach to the gathering of the necessary data.

3) The policies for oversight and accountability of monitoring activities:

   Monitoring of areas, volumes collected and identity of collectors is done by trained project personnel, understanding the importance of accurate data collection. Frequent training ensures that all technicians have a similar approach to the gathering of the necessary data.

4) The procedures for internal auditing and QA/QC:

All the collection sites employ a site administrator and quality control assistant. The collected volumes are monitored regularly and data are updated in the internal sheet.

5) The procedures for handling non-conformances with the validated monitoring plan:

   All the procedures described in the documents are already the results of recurrent corrections and adaptations of precedent procedures. More generally, the project has an adaptive approach, in which the project proponent and the local management team regularly document the lessons learned from previous experience and identify improvements to the project procedures.

   Non-conformances are recorded as separate events and excluded from the registry if the quantities collected are not within the boundaries of the TTS. In the case of repeated non-conformances, the TTS follows an adaptive approach where the event is handled by operational staff and recorded for annual review of the project methodology.

6) Any sampling approaches used, including target precision levels, sample sizes, sample site locations, stratification, frequency of measurement, and QA/QC procedures:

QA/QC by trained representatives of TTS upon data collection and regular monitoring. Monitoring frequency several times per month each time upon collection.

6 IMPLEMENTATION STATUS

6.1 Implementation Status of the Project Activity

The project Collection Instance's collection sites are currently collecting plastic waste and supplying to the project's Recycling Instance.

The project Recycling Instance 1, Pelletizer units 1 and 2 have been implemented and in operation since 1st January 2022 and 1st July 2022, respectively. Pelletizer 3 is commissioned as of 1st May 2023 with pelletisers 4 and 5 to be commissioned before 31st December 2023. PET , while collected, is awaiting appropriate recycling infrastructure and is hence for subsequent verification.

TTS representatives are in constant contact to monitor events. No events impacted waste collected and recycled.

6.1.1 Implementation Schedule

Future verifications are likely to be held in the same locations as this year

7 QUANTIFICATION OF COLLECTED AND/OR RECYCLED PLASTIC WASTE

7.1 Data and Parameters Monitored

PWRM 0001, V1.1, For collection:

Data / Parameter	$P_{collected,d,y}$
Data unit	Tonnes/year
Description	Amount of plastic waste collected by the project activity and transferred to destination d in year y.
Equation	Equation 3
Value	1518 tonnes[27]
Source of data	Measurement on a dry basis at the collection site/facility and/or at the end destination log books/records
Description of measurement methods and procedures applied	Measurement of collected plastic waste is carried out using weighing machines, and the data is documented in the logbooks provided with the goods receipt.
Frequency of monitoring/recording	Recorded every time collected material is sent from the project site/facility to the appropriate end destination
Quality Assurance/Quality Control (QA/QC) procedures to be applied	Weighbridges are calibrated according to the equipment manufacturer's specifications or at least every three years
Purpose	Calculation of project collected and/or recycled plastic waste
Comments	-

PWRP0002, V1.1, For recycling:

[27] Collection from current collection instances as defined for current monitoring period. PET is excluded from current monitoring period.

Data / Parameter	Sorting output
Data unit	Tonnes/year
Description	Quantity of sorted plastic waste of each material type i in year y.
Equation	-
Value	515 tonnes
Source of data	On-site measurement (logbooks/records)
Description of measurement methods and procedures applied	Measurement of each material type i with weighing scales after sorting of waste, and the data is documented in the logbook.
Frequency of monitoring/recording	Recorded at the time of sending each batch of sorted plastic waste from the sorting facility to the recycling facility.
Quality Assurance/Quality Control (QA/QC) procedures to be applied	Weighbridges are calibrated according to the equipment manufacturer's specifications or at least every three years.
Purpose	Calculation of project collected and/or recycled plastic waste
Comments	Where hazardous material is found during sorting, it must be eliminated and/or disposed of and removed from the process following relevant national, regional and local regulations

Data / Parameter	Recycling input
Data unit	- (Dimensionless)
Description	List of input materials (e.g., solvents, process fuels) to the recycling process. This includes the category of plastic waste of material type i and any other material(s) used in the recycling process in year y.

Equation	-
Value	Submitted as part of credit estimation sheet
Source of data	On-site records (log books/records)
Description of measurement methods and procedures applied	Weighing machines are used to weigh the plastic waste before sending as a recycling input and the data is recorded in the logbook.
Frequency of monitoring/recording	Recorded prior to each batch of sorted plastic waste entering the recycling process
Quality Assurance/Quality Control (QA/QC) procedures to be applied	Scales shall be calibrated according to the equipment manufacturer's specifications or at least once every three years. Hazardous material is not a part of the recycling activity. The same can be cross verified from the project reports and Quality control reports.
Purpose	Monitoring for compliance with Applicability Condition 5 in Section 4 of PWRP0002, v1.1
Comments	-

Data / Parameter	$P_{recycled,i,y}$
Data unit	Tonnes/year
Description	Amount of plastic waste of type i recycled by the project activity in year y (tonnes)
Equation	Equation 3 (PWRP0002, v.1.1)
Value	260 tonnes
Source of data	Direct measurement at project facility using weighing scales, the data is documented in the logbooks.

Description of measurement methods and procedures applied	Measurement of each material type i with weighing scale after the final stage at the recycling facility, before leaving the project site or being used for manufacturing products onsite.
Frequency of monitoring/recording	Recorded prior to each batch of recycled plastic waste leaving the recycling facility.
Quality Assurance/Quality Control (QA/QC) procedures to be applied	Scales shall be calibrated according to the equipment manufacturer's specifications (annual) or at least every three years. The amount of plastic recycled shall be cross-checked with sales receipts of the material sold to the final buyer or another equivalent third-party evidence.
Purpose	Calculation of project recycled plastic waste
Comments	If plastic is washed, it should be weighed after it has been dried. Only material types for which recycling activities are determined to be additional at validation are included for crediting.

For non-recycled plastic waste

Data / Parameter	End destination of non-recycled plastic waste End destination of non-plastic waste from recycling facility
Data unit	- (Dimensionless)
Description	End destination of plastic waste that enters the project recycling facility and is not recycled or is lost during the recycling process End destination of waste (other than non-recycled plastic) produced by the recycling activities of the facility. This includes any waste segregated at the sorting stage that is not used as an input to the recycling activity (if sorting is within the recycling facility) and any waste coming out of the recycling process.

Equation	- (There are no equation involved).
Value	Accredited third parties
Source of data	Direct measurement at project facility
Description of measurement methods and procedures applied	N/A
Frequency of monitoring/recording	Yearly
Quality Assurance/Quality Control (QA/QC) procedures to be applied	N/A
Purpose	Monitoring for compliance with Applicability Condition 11 in Section 4
Comments	End destination and/or management of hazardous waste streams, where possible, may be disclosed using ISO 14001:2015 – Environmental management systems – Requirements with guidance for use or other relevant standards or certification schemes.

7.2 Monitoring Results

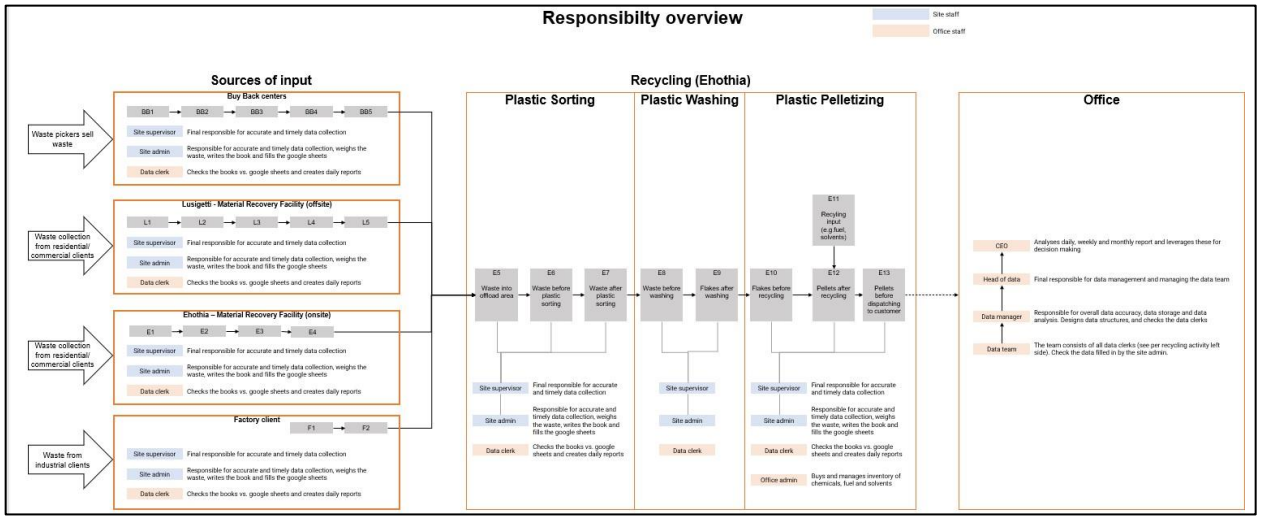
The monitoring was carried out according to the monitoring plan stated earlier in the document.

1) All the project weigh scales which require calibration and monitoring are attached as Annexure- 2 in this JPD&MR document. The weigh scale calibration certificates are submitted along with this JPD&MR.

2) The methods for measuring, recording, storing, aggregating, collating, and reporting data and parameters (including, where relevant, the procedures for calibrating monitoring equipment):All the collected and recycled material volumes are monitored regularly by TTS representatives. For traceability, the data are noted in delivery notes and internal sheets, which are validated by the site administrator and QC assistant.

   The organizational structure, responsibilities, and competencies of the personnel that will be carrying out monitoring activities:

   Monitoring is done by trained project personnel, understanding the importance of



Taka Taka Project Organogram

   accuratedata collection. Frequent training ensures that all technicians have a similar approach to the gathering of the necessary data.

3) The policies for oversight and accountability of monitoring activities:

Monitoring of areas, volumes collected and identity of collectors is done by trained project personnel, understanding the importance of accurate data collection. Frequent training ensures that all technicians have a similar approach to the gathering of the necessary data.

4) The procedures for internal auditing and QA/QC:

   All the collection sites employ a site administrator and quality control assistant. The collected volumes are monitored regularly, and data are updated in the internal sheet.

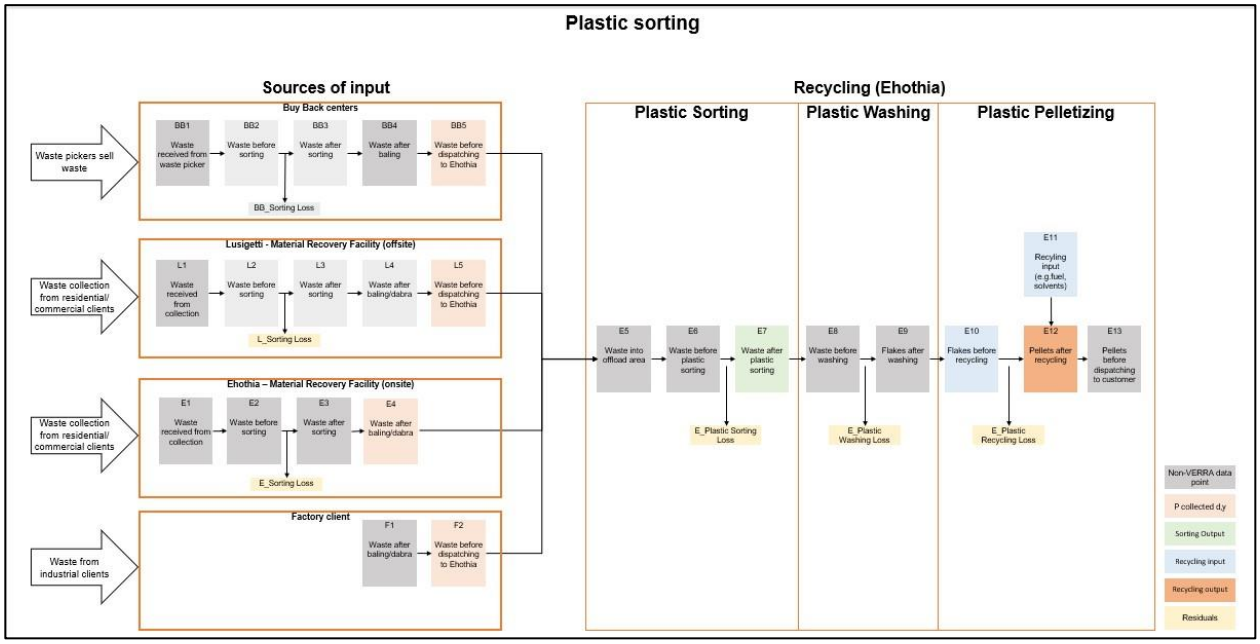
5) The procedures for handling non-conformances with the validated monitoring plan:

   All the procedures described in the documents are already the results of recurrent corrections and adaptations of precedent procedures. More generally, the project has an adaptive approach, in which the project proponent and the local management team regularly document the lessons learned from previous experience and identify improvements to the project procedures.

   Non-conformances are recorded as separate events and excluded from the registry if the quantities collected are not within the boundaries of the TakaTaka solution. In the case of repeated non-conformances, the TakaTaka solution follows an adaptive approach where the event is handled by operational staff and recorded for annual review of the project methodology.

6) Any sampling approaches used, including target precision levels, sample sizes, sample site locations, stratification, frequency of measurement, and QA/QC procedures:

no sampling is undertaken to determine material type, since the project does not include composite materials.



Responsibility organogram for TTS

7.3 Baseline Collected and/or Recycled Plastic Waste

The baseline plastic waste collected was determined as follows, according to PWRM0001 and outlined in a previous section of the document:

As it is a new activity, the collection activities in all five sites have a baseline of 0.

$B_{collected,d,y}$ = 0,

The baseline plastic waste recycled was determined as follows, according to PWRM0002 and outlined in a previous section of the document:

$B_{recycled,i,y}$ = 0

7.4 Project Collected and/or Recycled Plastic Waste

According to PWRM0001, project plastic waste collected is:

$$P_{collected,d,y} = \sum_{i=1}^{n} P_{collected,i,d,y}$$

(Equation 3)

Where:

$Pcollected,d,y$ = Total plastic waste collected by the project activity and transferred to destination d in year y (tonnes), where d is an appropriate end destination

$Pcollected,i,d,y$ = Amount of material type i collected by the project activity and transferred to destination d in year y (tonnes), where d is an appropriate end destination. Where material collected is not identified by type, this represents the total plastic waste collected by the project activity and transferred to destination d in year y (tonnes).

According to PWRM0002, project plastic waste recycled is:

$$P_{recycled,y} = \sum_{i=1}^{n} P_{p,recycled,i,y} \times AF_i + \sum_{i=1}^{n} P_{dp,recycled,i,y} \times MF$$

(Equation 3)

Where:

$Precycled,y$ = Total amount of plastic waste recycled by the project activity in year y (tonnes) $Pp,recycled,i,y$ = Amount of plastic waste of material type I recycled by the project activity in year y (tonnes) without depolymerization.

AFi = Adjustment factor for composite material I (see Adjustment factor under Section 8.1); for non-composite materials, this factor is equal to 1.

$Pdp,recycled,i,y$ = Amount of plastic waste in the form of depolymerized plastics of material type i recycled by the project activity in year y (tonnes). Since the material type can no longer be determined based on the output, it must be determined based on the input to the depolymerization process, using a mass balance approach.

MF = Mass fraction of the output of the depolymerization process used for plastic production

NOTE: on Adjustment Factor AFi: TakaTaka solution recycles and counts only non-composite materials as there is a pre-sorting process. This means that AFi = 1 for recycling activities and the project has no depolymerization activity, so the parameter $Pdp,recycled,i,y$ is 0.

PET is excluded from current monitoring period.

7.5 Net Collected and/or Recycled Plastic Waste

The net plastic waste collected is the amount of plastic waste collected by the project activity that would not have been collected without project implementation.

Net plastic waste collection is calculated as follows from PWRM0001:

$$N_{collected,y} = \sum_{d=1}^{m} P_{collected,d,y} - B_{collected,d,y}$$

(Equation 4)

Where: $Ncollected,y$ = Net plastic waste collected in year y (tonnes)

According to PWRM0002, net recycled is:

Where: $Ncollected,y$ = Net plastic waste collected in year y (tonnes)

$$N_{recycled,y} = P_{recycled,y} - B_{recycled,y}$$

(Equation 4)

Table 17: Net Collected Plastic Waste (all 13 Collection Instances)

Type of plastic	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Total
Polypropylene (PP)	118	137	185	138	150	123	63	86	1000
Polystyrene (PS) or expanded polystyrene (EPS)	0	0	0	0	0	0	0	0	0
Other plastics (O)	0	0	0	0	0	0	0	0	0
High-density polyethylene (HDPE)	24	20	29	22.	17	20	15	0	147
Low-density polyethylene (LDPE)	28	39	42	33	30	43	51	105	371
Polyvinyl chloride (PVC)	0	0	0	0	0	0	0	0	0
Total									**1518**

Note : *Error Factor* has been applied for month of April for Dandora collections on account of calibration certificate renewal being overdue by 14 days. Taking a conservative approach, the factor has been applied for the entire month (30 days) and total deduction of 2.14 tonnes of collected plastic waste has been made to account for it.

Error factor was applied based on the calibration certificates for project weigh scales and the maximum deviation noticed for the month of April 2022 of the Monitoring Period when scales were recalibrated.

Error Factor Calculation :

CDM Guidelines used as reference document: " GUIDELINES FOR ASSESSING COMPLIANCE WITH

THE CALIBRATION FREQUENCY REQUIREMENTS "

Actual recorded monthly collection from Dandora site = 107,675 Kgs (A)

Converting into tonnes (divide by 1000) = 107.67 tonnes (B)

April Collection (Rounding down into tonnes) = 107 tonnes (C)

Expiry of calibration of Dandora weighscale (D) = 6th /April/2023
Renewal of calibration (E) = 20th/ April/ 2023

(D) – (E) = no. of days of calibration expiration = 14 days (F)

Extrapolating 14-day calibration expiry gap to 30 days (1 month) for ease of calculation and conservative approach.

Calibration Certificate specifications for error range : +/- 1.2 KG over 1-1500 KGs (1.5 tonnes). Or +/-2% uncertainty for 1000 Kgs as per required standard.

Therefore,

Monthly recorded value at Dandora for April 2022 (monitoring period) = 107 tonnes

Based on 2% maximum uncertainty, the maximum erroneous reading therefore can be , as per CDM guidelines :

107+(107 *2/100) = 109.14 Tonnes (G)

G is maximum errorneous value that can be recorded.

rounding down =2 (H) tonnes of maximum errorneous reading.

Subtracting G-C = 2.14 tonnes, (I)

Subtracting (I) from actual recorded value for month (C) of April 2022 =

107- 2.14 = 104.86 tonnes , which is rectified value

Rounding down to lower limit of 104 tonnes

Therefore for Month of April 2022, applying error factor correction as per CDM guidance, the rectified recorded value taking conservative approach is 104 tonnes at Dandora collection site and is recorded as 104 tonnes of PP collection .

Table 18 : Net Recycled Plastic Waste (Recycling Instance 1)

Type of plastic	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Total
Polypropylene(PP)	0	29	61	56.	19	0	10	17	192
Expanded Polystyrene	0	0	0	0	0	0	0	0	0
Polystyrene	0	0	0	0	0	0	0	0	0
Other plastics	0	0	0	0	0	0	0	0	0
HDPE	0	0	0	0	15.	16	13	5.	49
LDPE	0	0	0	0	6.	1.	6	6	19
PVC	0	0	0	0	0	0	0	0	0
Total									260

8 Appendices

8.1 Appendix 1: Attached are pictures for the proof of project ownership – Business License (sample)



COUNTY GOVERNMENT OF KIAMBU

Website www.kiambu.go.ke
P.O Box Kiambu County HQ
Email: info@kiambu.go.ke

No. 167772

Kiambaa Sub County Licence No. 2022/A22A0339301 Year 2022

Grants This

SINGLE BUSINESS PERMIT

To

Business No.	Business Name		
A22A03393	TAKATAKA SOLUTIONS LIMITED		
Certificate of Registration ID No. CPR/2010/38521	PIN Number P051360973E	VAT Number	Contact Person RODA GAKII

To engage in activity / business / profession or occupation of:

Activity Code & Description:	815: Small Industrial Plant: premises up to 100 m2.
Detailed Activity Description:	"SORTING / COMPOSTING/ RECYCLING" [Small Industrial Plant: premises up to 100 m2.]

Having Paid Business License Fees Of:

KES 17,600.00

KES (In words) *** SEVENTEEN THOUSAND SIX HUNDRED ONLY***

Business under this license shall be exclusively conducted at the address indicated below:

Plot No.	Physical Location:	Ward:
C/CIANDA/324	CIANDA - IHUTHIA	Cianda

Postal Address	Telephone	Fax & Email:
1182 - 80108 KILIFI	0702021166	

Validity Period: Date Issued: 17 Jan 2022

Permit issued by:

For County Treasury

COUNTY GOVERNMENT OF KIAMBU
KIAMBAA SUB - COUNTY
REVENUE OFFICE
Date of issue: 31 Dec 2022
Stamp and Signature
Date of expiry
Printed by: Kiambu Notice

:02275A202201/0006436

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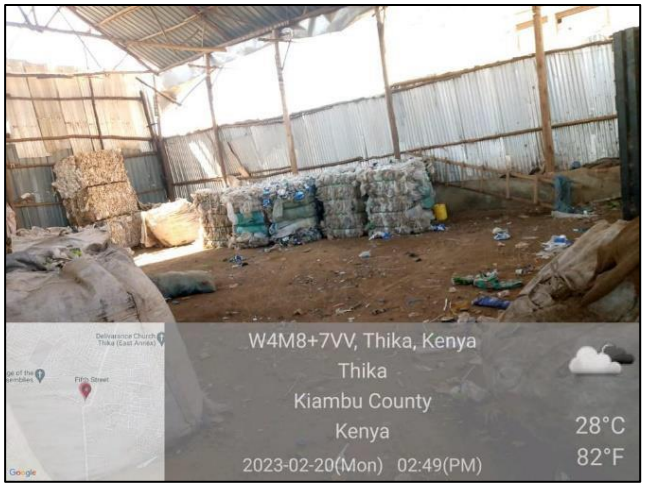
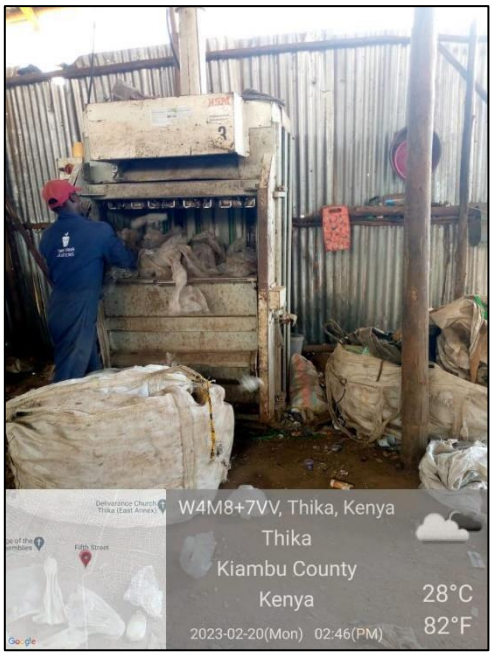
See Conditions Overleaf

8.2 Appendix 2: Attached are pictures for the proof of collection activity









Waste purchase photo from waste pickers at buyback center

8.3 Appendix 3: Attached are pictures for the proof of recycling activity





Plastic Pelletizer and Flexible washing line at Ehothia

Appendix 8.4: Attached are pictures of sold recycled material (Pellets)





Recycled plastics, having been sold to the manufacturer, are loaded on the truck

Appendix8. 5 : Organic waste composting within Ehothia Plant for





Appendix 8.6 : Project weigh scales

NO	Serial Number	Site	Location	Sub-area	Brand	Model name	Max.	D	installation	Calibration 2022	Due date	Calibration 2023	Delay by days	Uncertainaity
		Buyback Center	Dandora	Receiving	Gramscal	K3 BUFFALO 1212-3T HR	3000Kg	1000g	July 2021	06004-2022	6-4-2023	20/04123	14	(+/-)1.2kg
2	OF0007610	Buyback Center	Dandora	Baling	Gramscal	K3 XLION 1010-3T	3000kg	1000g	July 2021	06°04-2022	6-4-2023	20104/23	14	(+/-)1.2kg
3	OF0007605	Buyback Center	Mombasa	Baling	Gramscal	K3 X LION 1010-3T	3000Kg	1000g	November 2021	18/312022	18/03/2023	30106/23	102	(+/-) 1.2 kg
4	OF0007603	Buyback Center	Mombasa	Receiving	Gramscal	K3 X LION 1010-3T	3000Kg	1000g	November 2021	18/03/2022	18/03/2023	30/06123	102	(+/-)1.2kg
5	OF0001806	Buyback Center	Mombasa	Weighbridge	Gramscal	PRL-20T **with** MK3 indicator	20000kg	20000g	November 2021	15/03/2022	15/3/2022	30/06/23	105	(+/-) 1.2 kg
6	OF0007606	Buyback Center	Thika	Receiving/Balir			3000Kg	1000g	August 2021	20/04/2022	20/04/2023	20/04/23	0	(+/-)1.2kg
7	OF0007709	Buyback Center	Kitengela	Receiving/Balir				1000g	August 2021	13/07/2022	13/07/2023	20/04123	-83	(+/-)1.2kg
8	18868	Ehothia	Genera!!	Weighbridge	Gramscal	PRL-20T **with** MK3 indicator	60000 Kg	4000kg	September 2021	7-12-2022	7-12-2023	06·12-2023		(+/-)1.2kg
9	OF0007601	Ehothia	Recycling -	Taiwan Pelletiz			3000Kg	1000g	June 2022	16/05/2022	16/05/2023	13103123	-59	(+/-) 0.5 kg
10	TK/rnU/2301	Ehothia	Recycling -	Flakes - Outpu			3000Kg	1000g	March 2022	16/05/2022	16/05/2023	20/04123	-26	(+/-)1.2kg
11	OF0000007	Ehothia	Recycling -	Flexibles_ Inpu			3000Kg	1000g	March 2022	16105/2022	16/05/2023	26104123	-20	(+/-) 1.2 kg
12	0000201908	Ehothia	Recycling -	Plastic_lnput	Gramscal	K3 X LION 1010-3T	3000Kg	1000g	,June 2021	16105/2022	16/05/2023	10°02-23	-95	(+/-) 12kg
13	OF00051	Ehothia	Plastic Sarti	Baling	Gramscal	K3-X Lion-2015-5T	5000Kg	1000G	March 2022	28110/2022	28/10/2023	20/04123	-160	(+/-) 1.2 kg
14	OF0007708	Factory Client	Eabl	Baling	Gramscal	K3 BUFFALO 1212-3T HR	3000Kg	1000g	July 2022	11-8-2022	11-8-2023	30/06/2023	-42	(+/-)1.2kg
15	OF00025	Factory Client	Kenya Swe,	Baling	Gramscal	K3-XB-1212-1.5T	1500Kg	500g	September 2021	20/12/2022	20/12/2023	30/06123	-170	(+/-) 1.2 kg
16	OF00024	Factory Client	Kapa Oil	Balinq	Gramscal	K3-XB-1212-1.5T	1500Kq	500Q	August 2021	10-2-2022	10-2-2021	30/06/23	-140	{+/-) 1.2 k!=I

Appendix8.7 : Estimated Polymer wise Instance Collection (For 7 years)

Year 1								
Location	**Instance Name**	**PP**	**HDPE**	**LDPE**	**PS**	**PET**	**EPS**	**Total collections**
Dandora	BB01	900	0	0	0	0	0	900
Thika	BB02	36	0	0	0	0	0	36
Kitengala	BB03	36	0	0	0	0	0	36
Kisumu	BB04	36	0	0	0	0	0	36
Mlolongo	BB05	35	0	0	0	0	0	35
Nakuru	BB06	102	0	0	0	0	0	102
Kakuma	BB07	75	0	0	0	0	0	75
Mombasa	BB08	105	0	0	0	0	0	105
Ehothia	MRF 01	60	113	276	0	36	0	485
Lusigetti	MRF02	60	113	251	0	35	0	459
Mombasa	MRF03	0	0	0	0	0	0	0
Industrial client	IC01	25	0	32	0	0	0	57
Industrial client	IC02	25	0	32	0	0	0	57
								2383

Year 2								
Location	**Buy Back**	**PP**	**HDPE**	**LDPE**	**PS**	**PET**	**EPS**	**Total collections**
Dandora	BB01	1825	0	0	0	0	0	1825
Thika	BB02	258	0	0	0	0	0	258
Kitengala	BB03	257	0	0	0	0	0	257
Kisumu	BB04	257	0	0	0	0	0	257
Mlolongo	BB05	154	0	0	0	0	0	154
Nakuru	BB06	257	0	0	0	0	0	257
Kakuma	BB07	102	0	0	0	0	0	102
Mombasa	BB08	257	0	0	0	0	0	257
Ehothia	MRF 01	123	250	710	0	90	0	1173
Lusigetti	MRF02	86	250	710	0	85	0	1131
Mombasa	MRF03	37	74	76	0	6	0	193
Industrial client	IC01	90	0	2	0	0	0	92
Industrial client	IC02	90	0	2	0	0	0	92
								6048

Year 3								
Location	**Buy Back**	**PP**	**HDPE**	**LDPE**	**PS**	**PET**	**EPS**	**Total collections**
Dandora	BB01	6338	0	0	0	0	0	6338
Thika	BB02	930	0	0	0	0	0	930
Kitengala	BB03	930	0	0	0	0	0	930
Kisumu	BB04	930	0	0	0	0	0	930
Mlolongo	BB05	558	0	0	0	0	0	558
Nakuru	BB06	930	0	0	0	0	0	930
Kakuma	BB07	372	0	0	0	0	0	372
Mombasa	BB08	930	0	0	0	0	0	930
Ehothia	MRF 01	436	800	2250	0	300	0	3786
Lusigetti	MRF02	311	800	2200	0	300	0	3611
Mombasa	MRF03	132	429	756	0	41	0	1358
Industrial client	IC01	300	0	70	0	0	0	370
Industrial client	IC02	300	0	23	0	0	0	323
								21366

Year 4								
Location	**Buy Back**	**PP**	**HDPE**	**LDPE**	**PS**	**PET**	**EPS**	**Total collections**
Dandora	BB01	7458	0	0	0	0	0	7458
Thika	BB02	1047	0	0	0	0	0	1047
Kitengala	BB03	1047	0	0	0	0	0	1047
Kisumu	BB04	1047	0	0	0	0	0	1047
Mlolongo	BB05	628	0	0	0	0	0	628
Nakuru	BB06	1047	0	0	0	0	0	1047
Kakuma	BB07	420	0	0	0	0	0	420
Mombasa	BB08	1048	0	0	0	0	0	1048
Ehothia	MRF 01	513	1000	2900	0	350	0	4763
Lusigetti	MRF02	352	1000	2800	0	350	0	4502
Mombasa	MRF03	151	342	195	0	39	0	727
Industrial client	IC01	350	0	111	0	0	0	461
Industrial client	IC02	350	0	108	0	0	0	458
								24653

Year 5								
Location	**Buy Back**	**PP**	**HDPE**	**LDPE**	**PS**	**PET**	**EPS**	**Total collections**
Dandora	BB01	13625	0	0	0	0	0	13625
Thika	BB02	200	0	0	0	0	0	200
Kitengala	BB03	200	0	0	0	0	0	200
Kisumu	BB04	200	0	0	0	0	0	200
Mlolongo	BB05	200	0	0	0	0	0	200
Nakuru	BB06	200	0	0	0	0	0	200
Kakuma	BB07	200	0	0	0	0	0	200
Mombasa	BB08	740	0	0	0	0	0	740
Ehothia	MRF 01	578	1200	3000	0	390	0	5168
Lusigetti	MRF02	404	1200	3000	0	390	0	4994
Mombasa	MRF03	172	254	679	0	58	0	1163
Industrial client	IC01	400	0	125	0	0	0	525
Industrial client	IC02	400	0	125	0	0	0	525
								27940

Year 6								
Location	**Buy Back**	**PP**	**HDPE**	**LDPE**	**PS**	**PET**	**EPS**	**Total collections**
Dandora	BB01	9580	0	0	0	0	0	9580
Thika	BB02	1326	0	0	0	0	0	1326
Kitengala	BB03	1326	0	0	0	0	0	1326
Kisumu	BB04	1326	0	0	0	0	0	1326
Mlolongo	BB05	795	0	0	0	0	0	795
Nakuru	BB06	1327	0	0	0	0	0	1327
Kakuma	BB07	530	0	0	0	0	0	530
Mombasa	BB08	1179	0	0	0	0	0	1179
Ehothia	MRF 01	646	1250	3200	0	425	0	5521
Lusigetti	MRF02	452	1250	3200	0	425	0	5327
Mombasa	MRF03	192	466	750	0	86	0	1494
Industrial client	IC01	450	0	299	0	0	0	749
Industrial client	IC02	450	0	295	0	0	0	745
								31225

Year 7								
Location	**Buy Back**	**PP**	**HDPE**	**LDPE**	**PS**	**PET**	**EPS**	**Total collections**
Dandora	BB01	9580	0	0	0	0	0	9580
Thika	BB02	1326	0	0	0	0	0	1326
Kitengala	BB03	1326	0	0	0	0	0	1326
Kisumu	BB04	1326	0	0	0	0	0	1326
Mlolongo	BB05	795	0	0	0	0	0	795
Nakuru	BB06	1327	0	0	0	0	0	1327
Kakuma	BB07	530	0	0	0	0	0	530
Mombasa	BB08	1179	0	0	0	0	0	1179
Ehothia	MRF 01	646	1250	3200	0	425	0	5521
Lusigetti	MRF02	452	1250	3200	0	425	0	5327
Mombasa	MRF03	192	466	750	0	86	0	1494
Industrial client	IC01	450	0	299	0	0	0	749
Industrial client	IC02	450	0	295	0	0	0	745
								31225

Appendix8.8 : Actual Monitoring Period (1st January 2022- 31st August 2022)

PWRP-Buy Back	**P collected**

Collection

as per the plastic sorting reports

Buy Back Instance Collection (BB01)	2022 (Tonne)								
All materials made of the seven types of plastic:	**Jan**	**Feb**	**March**	**April**	**May**	**June**	**July**	**August**	**Total**
Polyethylene terephthalate (PETE or PET	0	0	0	0	0	0	0	0	0
polypropylene (PP),	89	97	149	104	118	84	24	50	715
expanded polystyrene (EPS)	0	0	0	0	0	0	0	0	0
polystyrene (PS)	0	0	0	0	0	0	0	0	0
other plastics (O)	0	0	0	0	0	0	0	0	0
high-density polyethylene (HDPE)	0	0	0	0	0	0	0	0	0
low-density polyethylene (LDPE)	0	0	0	0	0	0	0	0	0
polyvinyl chloride (PVC),	0	0	0	0	0	0	0	0	0
						Total			**715**
						Conservatively Rounded Down			

Collection	P collected								
MRF Collection (post sorting)	2022 (Tonne)								
All materials made of the seven types of plastic:	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Total
Polyethylene terephthalate (PETE or PET	0	0	0	0	0	0	0	0	0
polypropylene (PP),	26	33	36	34	32	37	37	33	268
expanded polystyrene (EPS),	0	0	0	0	0	0	0	0	0
polystyrene (PS)	0	0	0	0	0	0	0	0	0
other plastics (O)	0	0	0	0	0	0	0	0	0
high-density polyethylene (HDPE)	24	20	29	22	17	20	15	0	147
low-density polyethylene (LDPE)	28	39	42	33	30	43	39	71	325
polyvinyl chloride (PVC),	0	0	0	0	0	0	0.00	0.00	0
							Total		740
						Conservatively Rounded Down			

Collection

	P collected		
Industrial Clients Plastic waste collection (post sorting)	**2022 (Tonne)**		

All materials made of the seven types of plastic:	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Total**
Polyethylene terephthalate (PETE or PET	0	0	0	0	0	0	0	0	0
polypropylene (PP),	3	7	0	0	0	2	2	3	17
expanded polystyrene (EPS)	0	0	0	0	0	0	0	0	0
polystyrene (PS)	0	0	0	0	0	0	0	0	0
other plastics (O)	0	0	0	0	0	0	0	0	0
high-density polyethylene (HDPE)	0	0	0	0	0	0	0	0	0
low-density polyethylene (LDPE)	0	0	0	0	0	0	12	34	46
polyvinyl chloride (PVC),	0	0	0	0	0	0	0	0	0
Total							**Total**		**63**
					Conservatively Rounded Down				

Polymer/Collection Instance wise breakdown	2022 (tonne)								
All materials made of the seven types of plastic:	**Dandora**	**Thika**	**Kitengla**	**Lusigetti**	**Ehothia**	**IC-01**	**IC-02**	**-**	**Total**
Polyethylene terephthalate (PETE or PET)	0	0	0	0	0	0	0		0
polypropylene (PP),	692	23	1	82	184	18	0		1000
expanded polystyrene (EPS)	0	0	0	0	0	0	0		0.00
polystyrene (PS) or	0	0	0	0	0	0	0		0.00
other plastics (O)	0	0	0	0	0	0	0		0.00
high-density polyethylene (HDPE)	0	0	0	71	76	0	0		147.00
low-density polyethylene (LDPE)	0	0	0	105	221	0	45		371.00
polyvinyl chloride (PVC),	0	0	0	0	0	0	0		0.00
Total						**Total**			**1518**
					Conservatively Rounded Down				

Summation Table	2022 (tonne)								
All materials made of the seven types of plastic:	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Total**
Polyethylene terephthalate (PETE or PET	0	0	0	0	0	0	0	0	0
polypropylene (PP),	118	137	185	138	150	123	63	86	1000
expanded polystyrene (EPS)	0	0	0	0	0	0	0	0	0
polystyrene (PS) or	0	0	0	0	0	0	0	0	0
other plastics (O)	0	0	0	0	0	0	0	0	0
high-density polyethylene (HDPE)	24	20	29	22	17	20	15	0	147
low-density polyethylene (LDPE)	28	39	42	33	30	43	51	105	371
polyvinyl chloride (PVC),	0	0	0	0	0	0	0	0	0
						Total		**1518**	
							Conservatively Rounded Down		

2022 (Tonne)

sorting and washing and drying	**Sorting Output**								
Washing Line Output Ehothia(post sorting)	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	Total
Polyethylene terephthalate (PETE or PET	0	0	0	0	0	0	0	0	0
polypropylene (PP),	56	70	85	63	39	42	15	45	415
expanded polystyrene (EPS)	0	0	0	0	0	0	0	0	0
polystyrene (PS)	0	0	0	0	0	0	0	0	0
other plastics (O)	0	0	0	0	0	0	0	0	0
high-density polyethylene (HDPE)	0	0	11	13	10	26	6	8	74
low-density polyethylene (LDPE)	0	0		0	7	5	1	13	26
polyvinyl chloride (PVC),	0	0	0	0	0	0	0	0	0
							Total		515

	P recycled : Amount of plastic waste of material type i recycled								
Plastic Waste Recycled: Output Material									
final recycled pellets P recycle (EREMA + Taiwan)	2022 (Tonne)								
All materials made of the seven types of plastic:	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Total**
Polyethylene terephthalate (PETE or PET)	0	0	0	0	0	0	0	0	0
polypropylene (PP),	0	29	61	56	19	0	10	17	192
or expanded polystyrene (EPS),	0	0	0	0	0	0	0	0	0
polystyrene (PS)	0	0	0	0	0	0	0	0	0
other plastics (O)	0	0	0	0	0	0	0	0	0
high-density polyethylene (HDPE)	0	0	0	0	15	16	13	5	49
low-density polyethylene (LDPE)	0	0	0	0	6	1	6	6	19
polyvinyl chloride (PVC),	0	0	0	0	0	0	0	0	0
							Total		260