Plastic Waste Reduction Standard

A VERRA STANDARD

POLIBALBINO RECYCLING PROJECT IN BRAZIL

KOSHER CLIMATE

Document Prepared by Kosher Climate India Private Limited

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1 PROJECT DETAILS

1.1 Summary Description of the Project

The main purpose of this project activity is recycling of plastic wastes through mechanical recycling to give them secondary life. The project activity recycles plastic waste into usable products for further processing in manufacturing industries and new products that have a wide variety of applications. The quality of the recycled plastic waste is suitable for it to be used as feedstock in the manufacture of spare parts for the automotive sector, industry of artificial grass, industry of packages thereby displacing the use of virgin plastics. The plastic waste that is recycled consists of mainly pre-consumer and post-industrial waste.

The project activity is a capacity addition to an existing recycling activity of 4,276 tonnes/year to a cumulative capacity of 8,500 tonnes/year. The project is implemented and owned by Polibalbino Termoplásticos. The project activity is located in Guarulhos - SP, Brazil.

As per the latest information available, Brazil generates about 13.9 million tonnes per annum of plastic waste. Out of this only, around 2 million tonnes get recycled. In the absence of project activity, the plastic waste will end up in landfills and the environment through open disposal.

This is a voluntary action undertaken by the project proponent. The project complies with all legal and regulatory compliances applicable in the host country. The plastic credits generated through this project activity will help the industry and the sector in scaling up to a larger extent to further reduce the additional generated plastic waste in the country. This also helps to bridge the financial viability gap from the additional plastic credit revenue. This revenue is important to support the maintenance and growth of the activity, which currently depends solely on the unstable price competition between recycled and virgin plastic resin, as demonstrated in the article "*Resinas virgens tem queda de preços e prejudica recicladas"* (Virgin resin has price fall and harms the recycled resin market)[1].

The project activity is expected to generate an average of 2,902 plastic credits/annum over a 10-year fixed crediting period with total generated credits of 29,029 credits over the total crediting period.

Based on actual data available, the activity has generated 10,752 credits between 2018-2023.

1.2 Project Type and Eligibility (2.1)

The project is eligible under the scope of the Plastic Program as per the following:

[1] Web articles portal Plástico.com.br – Article "*Resinas virgens tem queda de preços e prejudica recicladas*", published in 03/02/2024

The types of plastics recycled by the project activity include polyethylene, polyvinyl chloride, polypropylene, and polystyrene. All these plastic material types are included under the scope of the Plastic Waste Reduction Standard Version.1.0 .

The project activity is a recycling activity that receives plastic waste from various sources all over the country and recycles it into new products that have a wide variety of applications.

Recycled feedstock is used in the manufacture of spare parts for the automotive sector, industry of artificial grass, industry of packages thereby displacing the use of virgin plastics. The process includes collection, sorting, and recycling. The project claims benefits for the recycling part only, which is an activity included under the scope of the Plastic Waste Reduction Standard. The activity is also supported by the Plastic Waste Reduction Program Methodology, "Plastic Waste Recycling Methodology, PWRM0002, V 1.1 ”

The project activity is a recycling activity and does not include activities that are excluded under the plastic program such as

- Reduction or reuse of plastic waste;
- Plastic footprint assessments or plastic waste-related claims;
- Generation of plastic waste for subsequent collection/recycling activities

The project does not generate any plastic waste primarily for the purpose of its subsequent collection and/or recycling. All the sources of plastic waste recycled are clearly identifiable. The plastic waste recycled primarily include plastics which are already been used and is thrown out in the environment for decay with no proper management.

1.3 Project Configuration (3.3)

The project has been designed to include a single installation only.

Eligibility Criteria (grouped projects only) (3.3.13)

Not applicable. The project includes a single installation and is not part of a grouped Project.

1.4 Project Proponent

Organization name	Polibalbino Termoplásticos
Contact person	Vinícius Balbino
Title	Sales Director

Address	Estrada Velha Guarulhos São Miguel, 3958 - Jardim Arapongas, Guarulhos - SP, CEP 07210-250
Telephone	(11) 2482-5022
Email	vinicius@polibalbino.com.br

1.5 Other Entities Involved in the Project

Organization name	Kosher Climate India Private Limited
Role in the project	Project Representative
Contact person	Vamsi Krishna M
Title	Director
Address	Zee Plaza, No.1678, 27th Main Rd, Near KLM Mall, Sector 2, HSR Layout, Bengaluru, Karnataka 560102, India
Telephone	+91 99453 43475
Email	vamsi@kosherclimate.com

1.6 Ownership (3.4)

The project is implemented and owned by Polibalbino Termoplásticos. The project complies with all legal and regulatory compliances applicable in the host country.

1.7 Project Start Date (3.5)

The start date of the project activity is determined by the operational start date of recycling after the completion of capacity addition. The project has undergone two capacity additions with first on 1st January 2018 and second on 1st January 2021. The start date of the project activity is 1st January 2018.

1.8 Project Crediting Period (3.6)

The project adopts a fixed crediting period of 10 years starting from January 1st, 2018, to December 31st, 2027.

1.9 Estimated Collected and/or Recycled Plastic Waste

Year	Estimated Net Recycled Plastic Waste (tonnes)
2018	1,708
2019	1,708
2020	1,708
2021	3,415
2022	3,415
2023	3,415
2024	3,415
2025	3,415
2026	3,415
2027	3,415
Total estimated amount	29,029
Total number of crediting years (where applicable)	10
Average annual amount	2,902

1.10 Description of the Project Activity

The project activity is a capacity addition to an existing recycling plant. The activity aims to recycle various plastic wastes to give them secondary life, which will reduce the production of virgin plastics. The quality of the recycled plastic waste allows it to be used as feedstock in the manufacture of spare parts for the automotive sector, industry of artificial grass, industry of packages and others, thereby displacing the use of virgin plastics. The project is owned and implemented by Polibalbino Termoplásticos

The company collects plastic waste through various sources, such as municipal bodies, landfills, industries, and others, and recycles them into new products that have a wide variety of applications. The plastic waste is then taken to the facility, where it is sorted into different plastic types. The waste is then resized into smaller granules using shredders and granulators. The plastic waste is washed to remove traces of dirt and contaminants. The waste is then

compounded into small pellets. These pellets are recycled to manufacture new products or distributed to other plastic product manufacturing companies.

The plastic types recycled by the project include polyethylene, polyvinyl chloride, polypropylene, and polystyrene. Additional plastic types shall be incorporated based on future scenarios, depending on recycling demand and innovation.

1.11 Project Location (3.7)

The project is located in Guarulhos, Brazil. The geographical coordinates of the project are 23° 27' 14.9868" southern latitude and 46° 32' 2.7456" western longitude



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.

1.12.2 Social and Environmental Conditions

The vast majority of plastic waste generated usually ends up in landfills, and in the environment, Plastics in landfills, dumpsites and the environment can undergo chemical changes and release harmful chemicals into the soil, thereby polluting groundwater. The waste can also be harmful to various animal and plant species, thus affecting biodiversity as well.

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

The project proponent ensures that the project activity is compliant with all relevant laws and regulations in Brazil in regards to the setting up and management of a recycling facility.

The following laws and regulations are followed in this project activity:

1. National Solid Waste Policy: The law sets targets for waste reduction and proper disposal and also governs waste management in Brazil.

2. Environmental License: All recycling plants in Brazil require an environmental license for setting up and operation.

3. Labor and health standards: These regulations protect the rights and wellbeing of plant workers in the facility.

1.14 Additional Information Relevant to the Project

Commercially Sensitive Information (3.2.2)

Not applicable.

Further Information

No further information.

2 STAKEHOLDER ENGAGEMENT AND SAFEGUARDS

2.1 Stakeholder Engagement (3.13)

2.1.1 Stakeholder Identification (3.13.1)

The stakeholders have been identified as per Section 3.13 of the Verra Plastic Waste Reduction Standard. The project proponent has conducted an in-depth analysis of various entities involved in the activity to identify the stakeholders associated with the project

2.1.2 Stakeholder Description (3.13.2 – 3.13.3)

The list of stakeholder groups associated with the project activity is identified as follows:

1. Waste collectors: These are personnel associated with the first step of the project activity who are involved in the collection and separation of waste.

2. Employees: These are personnel employed by the project activity and involved in various steps of the project activity. The areas include waste separation by type, mechanical recycling, and transportation associated with project activity.

3. Government entities: Government organisations and officials are an integral part of the project activity as they are involved in the pollution and sustainability aspects of the project.

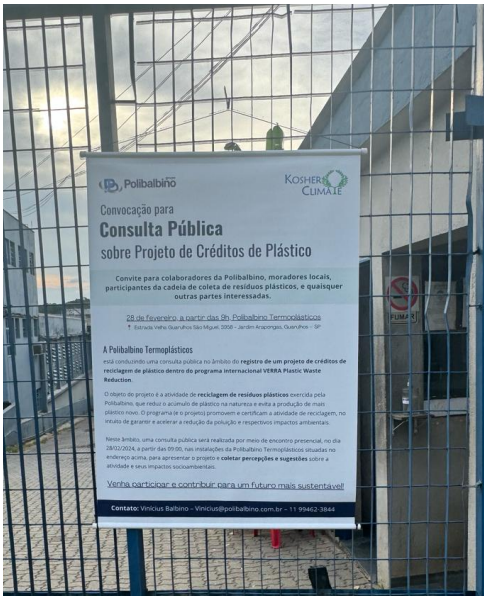
2.1.3 Stakeholder Consultation (3.13.4 – 3.13.8)

A stakeholder consultation was conducted on February 28, 2024 at 9:00 a.m. at Polibalbino's facilities located at Estr. Velha Guarulhos São Miguel, 3958 Jardim Arapongas, Guarulhos, SP-CCEP: 07210-250, in order to present the project to the stakeholders and collect their perceptions about it, including its socio-environmental aspects.

The general public, which includes waste collectors and employees, was invited through public notices to attend the meeting and express their views on the social and economic benefits of the project. During the meeting, details about Polibalbino's recycling activity and the respective Plastic Recycling Credits mechanism were presented to stakeholders, providing a basic understanding of the mechanism and the benefits involved.

An explanatory presentation about the project was also presented to the stakeholders. The majority of the stakeholders expressed a unanimous positive perception of the project activity. They agreed that the plastic credit mechanism is an effective way to increase the potential of recycling, and there is a real requirement for improvement in Brazil’s overall recycling capacity.

Invitations



Public Notice



Roundcube Webmail :: Convocação de consulta publica 27/02/2024, 15:54

Assunto **Convocação de consulta publica**
De Vinicius Balbino <vinicius@polibalbino.com.br>
Para <sepro@imma.gov.br>
Cópia <nagaraj@kosherclimate.com>
Data 2024 02 27 14:49

roundcube

Prezada autoridade,

A **Polibalbino Termoplásticos** está conduzindo uma consulta pública no âmbito do registro de um projeto de créditos de reciclagem de plástico dentro do programa internacional VERRA Plastic Waste Reduction. O objeto do projeto é a atividade de reciclagem de resíduos plásticos exercida pela Polibalbino, que reduz o acúmulo de plástico na natureza e evita a produção de mais plástico novo.

O programa (e o projeto) promovem e certificam a atividade de reciclagem, no intuito de garantir e acelerar a redução da poluição e respectivos impactos ambientais. Neste âmbito, uma consulta pública será realizada por meio de encontro presencial, no dia **28/02/2024**, a partir das **09:00**, nas **instalações da Polibalbino Termoplásticos** situadas no endereço **Estrada Velha Guarulhos São Miguel, 3958 - Jardim Arapongas, Guarulhos – SP**, para apresentar o projeto e coletar percepções e sugestões sobre a atividade e seus impactos socioambientais.

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Polibalbino grupo

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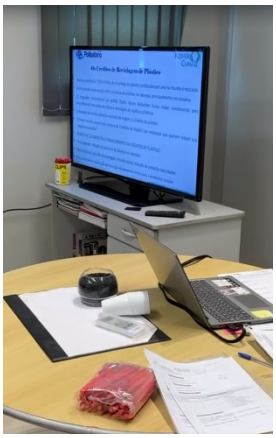
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http://webmail.polibalbino.com.br/?_task=mail&_uid=1695&_mbox=INBOX.Sent&_action=print&_extwin=1 Página 1 de 1

Invitation to Ministry of Environment and Climate Change (which is also responsible for Waste Management) , Government of Brazil

Photographs from the meeting





2.1.4 Free, Prior and Informed Consent (3.13.6)

Not applicable as no property rights are affected by this project

2.1.5 Continued Consultation and Adaptive Management (3.13.9)

A continuous mechanism has been put in place at the facility to continue communication and consultation between the project proponent(s) and stakeholder groups about the project and its impacts. This involves a grievance registry kept at the project facility and ongoing onsite visits to understand the conditions of the employees involved in the project activity.

2.1.6 Anti-Discrimination (3.13.10)

The project activity is a recycling activity. There are no entities involved in project design and implementation that are involved in, or complicit in, any form of discrimination or sexual harassment with respect to the project.

2.1.7 Feedback and Grievance Redress Procedure (3.13.11)

A grievance registry is kept at the project facility to register grievances from any employee or stakeholder. There will also be onsite visits to understand the conditions of the employees involved in the project activity.

2.1.8 Feedback and Grievance Redress Procedure Accessibility (3.13.12)

The grievance registry is placed at a location that is accessible to all. The implementation of the grievance registry at the project facility and other procedures have been effectively communicated to all stakeholders involved.

2.1.9 Stakeholder Access to Project Documentation (3.13.13)

The full project documentation, including project description documentation and monitoring reports (as they become available through the project lifetime), will be made accessible to all stakeholders, especially marginalised and/or vulnerable stakeholder groups, through the facility in charge. It will be communicated to all the stakeholders that the documents associated with the project are easily available in the Verra Registry, and hard copies of the same shall be collected from the facility upon request.

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

Adequate measures shall be taken to inform stakeholders of the Project Validation and Verification Process used by the Plastic Program. The process shall be completed within 1 week of the validation or verification body's site, either through emails, phone calls, or both. The project proponent shall ensure direct and independent communication between stakeholders or their representatives and the assessor

2.2 Public Comments (3.13.15 – 3.13.18)

Will be updated later.

2.3 Safeguards (3.14)

2.3.1 Health and Safety (3.14.2 – 3.14.3)

The project activity is a capacity addition to an existing recycling activity. There are no potential health impacts as a result of the project activity in the project boundary. The project activity, primarily involving mechanical recycling, has very fewer potential hazards compared to other forms of recycling. Inhouse training shall be given to workers regarding operation of various equipment and safety norms associated with recycling.

2.3.2 Labor (3.14.4 – 3.14.8)

The project proponent follows all relevant state and national laws regarding labor. There has been no elimination of income-generating activities as a result of the project activity.

2.3.3 Energy Efficiency and Greenhouse Gases (3.14.9 – 3.14.13)

The equipment in the recycling facility is powered by electricity sourced from the grid. They produce less emissions compared to other forms of fossil fuel-based generators. The other major source of emissions includes from transportation. The project proponent is actively involved in scheduling and management systems to reduce its impact.

2.3.4 Condition of Natural Resources (3.14.14 – 3.14.15)

The project activity does not impact the air quality, water quantity/quality, soil quality, biodiversity, ecosystem's health or threaten any species in the project boundary. The main purpose of this project activity is the recycling of plastic wastes to give secondary life for the plastic waste, which will reduce the production of virgin plastics.

The plastic waste in absence of project activity could end up in landfills, dumps ites and the environment. Plastics in landfills and the environment can undergo chemical changes and release harmful chemicals in the soil, thereby polluting groundwater. The waste can also be harmful to various animal and plant species, thus affecting biodiversity as well.

The project activity reduces instances of exposure of small minute plastic material into the atmosphere and thereby improves the air quality in the project boundary. Similarly, the project activity reduces the presence of Plastics in water and soil, thereby improving their quality. Plastic waste reduction through recycling will also have great impact on biodiversity and ecosystem, as less flora and fauna shall be exposed to plastics compared to the reproject scenario.

2.3.5 Additional Impact Certifications (3.14.16)

Not applicable

3 APPLICATION OF METHODOLOGY

3.1 Title and Reference of Methodology (3.1.2)

Title : PWRM0002 Plastic Waste Recycling Methodology version 1.1[2]

3.2 Applicability of Methodology

Project Proponent has used PWRM0002 Plastic Waste Recycling Methodology version 1.1.

The applicability criteria of the applied methodology are demonstrated below.

PWRM0002 Plastic Waste Recycling Methodology version 1.1	
Applicability conditions	Project Eligibility
1. Project activities result in recycled plastic waste through one or more of the following: a) Installation of a new recycling facility b) Capacity addition to or technology improvement of an existing recycling facility (e.g., retrofit or modification of	The project activity involves capacity addition to or technology improvement of an existing recycling facility.

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

an existing recycling facility, such as installation of new equipment or replacement of old equipment, which results in increased recycling capacity) c) Incentivizing and/or facilitating an increase in the collection and/or sorting of plastic waste to enable an increase in its recycling (e.g., paying price premiums to collectors, establishing collection or sorting points at landfills, sorting recyclable plastic waste) Projects that enable an increase in the recycling of plastic waste through increased collection and/or sorting of plastic waste must be able to provide the evidence necessary to meet the requirements of this methodology. The recycling facility or facilities that process the collected and/or sorted plastic waste must be included in the project boundary and the project proponent must describe the procedures or arrangements (e.g., contractual agreements) in place to eliminate double counting of recycled plastic waste potentially resulting from the project proponent and a recycling facility both claiming credits for the same recycled plastic waste	
2. The plastic waste being recycled is either collected or diverted from:: a) The environment; b) Landfill; c) Open burning; d) Incineration with energy recovery; e) Households and/or commercial entities; f) Incineration without energy recovery; or g) Any other waste management option that does not allow for a second life of the plastic waste	The plastic waste being recycled in the project activity is primarily collected from sources such as environment and landfill.

3. Project activities include mechanical and/or chemical recycling as defined in the latest version of the Plastic Program Definitions.	The project activity includes mechanical recycling as defined in the latest version of the Plastic Program Definitions.
4. The plastic waste stream is sorted before it enters the recycling process. The project proponent must provide a sorting description (i.e., documentation of the sorting process implemented by the sorting facility prior to the recycling process). The sorting process must result in a plastic waste stream (homogeneous or heterogeneous) that is appropriate for the recycling technology used in the project. The sorting description must include the following a) Source of the plastic waste (e.g., household, industrial entity); b) Technologies and methods used to sort the plastic waste; c) Detailed description of the sorting criteria; and d) Expected material composition of output waste streams post-sorting, according to material types defined in the latest version of the Plastic Standard Technologies and/or methods for sorting plastic waste include, but are not limited to, manual sorting (i.e., based on color, size or other physical features), automatic sorting techniques (e.g., near infrared, X-rays), electrostatic sorting, sink-float separation and selective dissolution. This methodology does not prescribe or limit the technology and/or method used to sort plastic waste. Credible evidence such as manufacturer specifications or good practice guidance (GPG) must be provided to demonstrate that the technology and/or method used to sort plastic waste is appropriate for the collected plastic waste and the technology or technologies used to recycle the plastic waste	The plastic waste is sorted at the starting destination by preliminary sorting and a type-based sorting at the recycling facility before undergoing recycling process. The project activity collects plastic waste from all over brazil from various sources, such as municipal bodies, landfills, industries, and others, and recycles them into new products that have a wide variety of applications. The plastic waste is then taken to the facility, where it is sorted into different plastic types. The waste is then resized into smaller granules using shredders and granulators. The plastic waste is washed to remove traces of dirt and contaminants. The waste is then compounded into small pellets. These pellets are recycled to manufacture new products or distributed to other plastic product manufacturing companies.

5. Plastic waste intended for recycling is not mixed with hazardous materials or substances (e.g., coatings, adhesives or colorants) that could become unsafe if compressed, combined or exposed to high temperatures during the recycling process. If the plastic waste contains hazardous materials or substances, it must be treated following relevant national, regional and local regulations, industry best practices and/or internationally or nationally available GPG before entering the recycling process.	The collected plastic waste before recycling undergoes rigorous sorting procedures. The plastic waste is sorted by type and then washed to remove any dirt or containments.
6. It is possible to directly measure and record the final output of the recycling facility (i.e., the weight of recycled plastic waste or any other kind of raw material derived from plastics using chemical processes) segregated by material type as defined in the latest version of the Plastic Standard. Where the output is of a chemically decomposed form of plastics and the material type can no longer be determined (i.e., in the case of chemical recycling), the material type must be determined based on the input to the depolymerization process, using a mass balance approach.	The final output of the recycling facility is measured based on weight and will be segregated by material type, as defined in the latest version of the Plastic Standard. The production logs and export logs can be verified to prove the same.
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. Properties of the output of the recycling facility (e.g., presence and/or type of contamination, characteristics of macromolecules, chemical stability) may be used to demonstrate quality. Only the fraction of the output of the recycling facility that is or can be used to produce recycled plastics is eligible for WRCs. Any output that is used as a fuel, for energy recovery and/or as a chemical for any purpose other than plastic production is not eligible for WRCs. Exceptions are made only for the recycling of composite materials that contain plastic and other materials. Projects applying the exception must instead demonstrate that: a) Plastic polymers cannot be separated out from the composite material and recycled independently (e.g., there is a lack of accessible or applicable technology in the market to separate the layers of the composite material to	The recycled plastic waste is used to produce tiles and as feedstock for the manufacture of recycled products and thereby displaces the use of virgin plastic. Contractual agreements will be provided at the time of validation, that the ownership of the waste recycling credits is with the project proponent, as some of the recycled waste is used as feedstock for third parties.

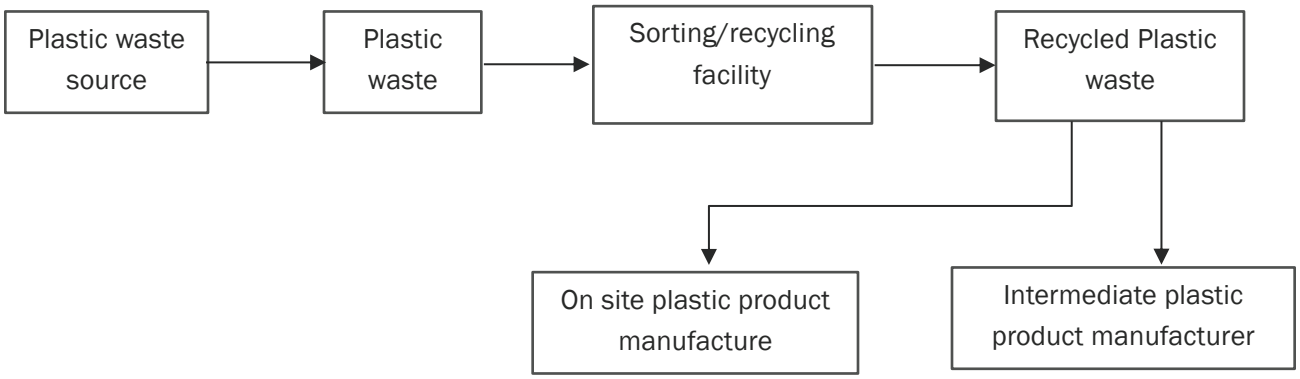
independently recycle each plastic component); and b) The project implements a suitable application for the recycled material that is designed to be durable (i.e., lifetime of more than 10 years). This can be demonstrated through, among others, evidence of product development to extend the lifetime of the recycled product or results of product testing for durability. Independent quality studies of similar products (i.e., products made of a similar combination of materials, with similar characteristics to the materials in the project activity and a similar resulting application) may also be used to demonstrate durability. Where the project activity includes the manufacture of recycled products from composite materials, such applications must not combine the composite materials with other non-composite plastic waste such that it is not possible to separate the additional non-composite plastic materials for recycling after use. Credible evidence such as contractual agreements, receipts of sale of recycled material, third-party audits, third-party survey results or chain of custody certification (e.g., ISCC PLUS) must be provided to demonstrate compliance with this applicability condition. In all cases, credible evidence must be provided from a source that can be verified by the validation/verification body (VVB).	
8. There is recyclable plastic waste available in the region that would not have been recycled in the absence of the project. Availability of recyclable plastic waste may be demonstrated by, among others, using the most recent publicly available data on plastic waste generation and recycling rates in the region to show that there is plastic waste that is not being recycled.	As per the latest information available, Brazil generates about 13.9 million tonnes per annum of plastic waste. Out of this only, around 2 million tonnes get recycled.
9. Project activities that include any depolymerization of sorted plastic waste streams must justify why the materials in the sorted plastic waste stream cannot be recycled using any other technology or technologies resulting in a smaller relative reduction in (macro)molecular mass. Credible evidence must be provided to	The project activity does not include any depolymerization of the plastic waste. This criterion is not applicable.

demonstrate that such project activities meet one or more of the following conditions:: a) Any recycling process resulting in a smaller reduction in (macro)molecular mass would not allow the output to displace the use of virgin feedstock for plastic production. b) The technology and/or process used in the project activity that results in a greater reduction in (macro)molecular mass has a lower energy intensity and/or lower GHG emissions compared to other technologies and/or processes that produce a similar quality output. For the comparison of technologies, the entire process from the exit of the sorting facility (if separate from the recycling facility) to the production of recycled plastic granulate must be included.	
10. The project activity does not compete with other recycling activities or include plastic waste that has been diverted from a historically existing, legally recognized recycling activity. Evidence, such as proof of how the plastic waste was managed over the three-year period prior to implementation of the project activity, must be provided to demonstrate that the project activity does not divert plastic waste from any historically existing, legally recognized recycling activity	The project activity does not compete with other recycling activities or include plastic waste that has been diverted from a historically existing, legally recognized recycling activity.
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. Where a project can reasonably only access one of these excluded end destinations, the project proponent must demonstrate that the nature of the end destination is comparable to the plastic waste source and must provide justification for why the project is not reasonably able to access an alternative end destination. In all cases, open dumping of plastic waste onto open land or into water bodies is not permitted.	The recycling process may produce some residual plastic waste, which is pretreated to remove chemical content. These wastes are not disposed of in water bodies or burned. They are disposed of based on relevant national standards.

If the plastic waste that was not recycled in the facility or the waste from the recycling activities contain hazardous substances, the waste must be managed through environmentally and socially appropriate technologies and processes in accordance with relevant national, regional or local regulations or guidelines	
12. The plastic waste to be recycled has been collected in and imported from other countries, except in either or both of the following circumstances: a) The project recycles plastic waste (using sustainable waste management practices) imported from a Least Developed Country (LDC) or Small Island Developing State (SIDS). b) The project imports plastic waste from other countries for further processing where there is insufficient plastic waste available in the exporting country to enable development of recycling infrastructure at the time of project validation. Project proponents must demonstrate the same through primary surveys or secondary literature available in the public domain and/or certified by a competent authority. Where either or both of the above circumstances exist, a robust and transparent chain of custody from the source of plastic waste to the end destination of the project activity must be provided.	The plastic waste to be recycled has not been collected in and imported from other countries. This criterion is not applicable.

3.3 Project Boundary (3.8)

Source		Material Type	End-of-Life	Explanation
Baseline	Pre-Consumer waste	PET	Environment, Unregulated landfills, Dump sites	In the absence of the project activity, plastic waste is disposed to environment where it releases chemicals through various process such as burning, and chemical breakdown
		PP		
		PVC		
		PS		
	Post-industrial waste	PET	Environment, Unregulated landfills, Dump sites	In the absence of the project activity, plastic waste is disposed to environment where it releases chemicals through various process such as burning, and chemical breakdown
		PP		
		PVC		
		PS		
Project	Pre-Consumer waste	PET	Mechanical Recycling	The project activity sorts and recycles the plastic waste collected based on their type into recycled plastic products and plastic pellets which can be used in subsequent production of other recycled products. As a result, the project activity displaces the production of plastic products.
		PP		
		PVC		
		PS		
	Post-industrial waste	PET	Mechanical Recycling	The project activity sorts and recycles the plastic waste collected based on their type into recycled plastic products and plastic pellets which can be used in subsequent production of other recycled products. As a result, the project activity displaces the production of plastic products
		PP		
		PVC		
		PS		



Project boundary diagram

The project boundary consists of the plastic waste source, the plastic waste, the recycling facility, and the end use of the recycled products. The plastic waste is collected from industries and factories. The waste is then recycled in the facility after sorting. The recycled plastic waste is then used for the manufacture of new plastic products that have a wide variety of applications.

3.4 Project Region

The project is located in Guarulhos, Brazil. The project will cover recycling mainly from various regions of Brazil, primarily from surrounding region of the project activity

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

As per the latest information available, Brazil generates about 13.9 million tonnes per annum of plastic waste. Out of this only, around 2 million tonnes get recycled. In the absence of project activity, the plastic waste will end up landfills and environment through open disposal.

In the baseline, the plastic waste is usually disposed of into the environment without any chemical treatment. As Brazil has a large population and uses various types of plastic waste, there are various types of complications arising from this type of baseline disposal. Plastics in landfills and the environment can undergo chemical changes and release harmful chemicals into the soil, thereby polluting groundwater. The waste can also be harmful to various animal and plant species, thus affecting biodiversity as well. Plastic waste undergoing chemical breakdown can generate pollutants that are toxic to health and can contribute to climate change.

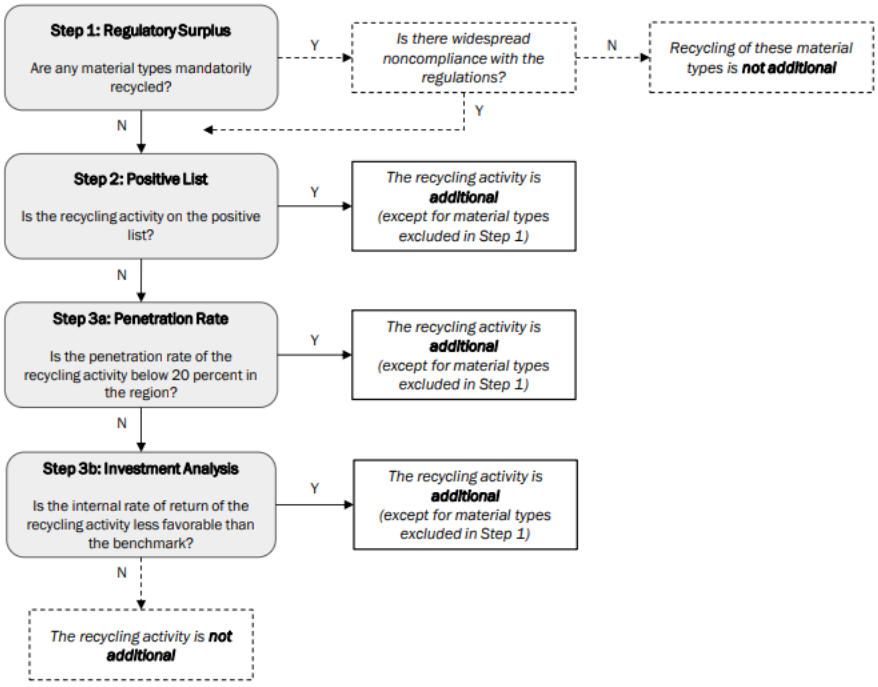
The project activity is a capacity addition to an existing recycling activity of 4,276 tonnes/year to a cumulative capacity of 8,500 tonnes/year. This capacity addition is achieved through the

addition and purchase of new equipment. The revenue from plastic credits will be used to finance the upgrade, maintenance, and operation of the facility.

3.6 Additionality (3.10)

Demonstration of recycling additionality through PWRM0002 v1.1:

The following decision tree represents various process to prove additionality as per PWRM0002 Plastic Waste Recycling Methodology version 1.1[3]



Step 1: Regulatory Surplus: The project proponent must demonstrate that the project activity proactively exceeds the current regulations or the regulatory compliance scenario:

The following laws are relevant in terms of plastic waste management in Brazil.

1. National Policy on Solid Waste (PNRS)[4] : The law determines rules and targets in solid waste management in Brazil, It targets development of recycling industry, through reverse logistics. The law expands a type of extended producer responsibility of recycling where producer, importer and distributers share responsibility for proper recycling of the waste, The PNRS intends to establish a National Plan of Solid Waste (PLANARES)[5] through its implementation.

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

[4] https://www.gov.br/ibama/ptbr/assuntos/emissoes-e-residuos/residuos/politica-nacional-de-residuos-solidos-pnrs

[5] http://www.planalto.gov.br/ccivil_03/_ato2019- 2022/2022/decreto/Anexo/and11043.pdf

2. Sectoral Agreement for Implementation of a Reverse Logistic System of Packaging (2015) : The agreement establishes a goal of 22% reduction in general packaging by 2018 through corrective actions from companies, collectors and recyclers. The agreement was signed between Ministry of Environment and companies belonging to 25 class associations. The National Plan of Solid Waste, PLANARES, also established reduction targets for general packaging.

3. Reverse logistics targets: The Ministry of Environment published a Federal Decree[6] in 2023 which establishes a reverse logistics system through certificates. However, these targets does not define recycling targets by material type.

Based on the above laws established, it has been proved that Brazil has targets for recycling plastics in general packaging. These targets are neither defined by material type nor doesn't demand any specific obligation for recycling.

Outcome: There is no regulations in the host country that enforce recycling of the relevant material type(s). The existing targets are based on general packaging and are not systematically enforced, Proceed to Step 2.

Step 2: Positive list: Project activities are deemed automatically additional if the entire project activity, including all material types for which recycling is deemed additional in Step 1, constitutes at least one of the following. Both the plastic waste source and the recycling activity must be located in the region(s) specified

- **Recycling activity in a low-income country**
- **Recycling activity in rural areas of a lower-middle income country**
- **Recycling activity including only mono-material flexible materials (e.g., films, carrier bags, pouches, pallet shrouds, including multi-layer plastics) or composite materials containing both plastic and non-plastic (both rigid and flexible, e.g., sachets, foils, envelopes, diapers, liquid packaging boards such as used beverage cartons) located in a lower-middle income country**
- **Recycling activity located on islands that can be classified as rural in a lower-middle or upper-middle income country**
- **Recycling activity located in a Special Underdeveloped Zone (SUZ).35 An SUZ is a region in the host country that has been identified by the government in official notifications for development assistance, including for planning, management and investment, and that satisfies any one of the following conditions using the most recent data available:**
    - **The proportion of the population with income (i.e., purchasing power parity) of less than 2 USD per day in the region is greater than 50 percent;**

- **The gross national income (GNI) per capita in the host country is less than 3,000 USD and the population of the region is among the poorest 20 percent in the poverty ranking of the host country as per the applicable national policies and procedures; or**
- **The proportion of the population in the region with income less than the national poverty line used by the host country for reporting on the United Nations Sustainable Development Goals (SDGs) is greater than 50 percent**

The project activity covers the recycling of plastic waste in the entire region of Brazil. Brazil is a upper middle-income country and doesn't satisfy the conditions of the positive list.

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

Step 3a: Project Method – Penetration Rate of Recycling Activity: The project proponent must assess the penetration rate of the project activity

The penetration rate is determined using the following Equation:

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

Where:

C = Total installed recycling capacity

G = Total plastic waste generation

Based on general information available, the total municipal solid waste ("MSW") generated in Brazil in 2021: 82,664,213 tonnes/year. The as per a study by Abrelpe, the % of plastic waste present in municipal solid waste in Brazil is 16.8%. Hence, the total plastic waste generated in 2021 is 13,887,588 tonnes/year. The total installed recycling capacity of facilities in Brazil in 2021 of 2,032,000 tonnes/year

Based on this study, it can be determined that Brazil generates about 13.9 million tonnes per annum of plastic waste. Out of this only, around 2 million tonnes get recycled.

The penetration rate is calculated as 14.6% which is less than 20%. Hence the project is deemed additional.

3.7 Methodology Deviations (3.15)

No deviations applied.

4 ESTIMATED COLLECTED AND/OR RECYCLED PLASTIC WASTE

4.1 Baseline Collected and/or Recycled Plastic Waste

Baseline recycled plastic waste is the amount of plastic waste that would have been recycled in the absence of the project activity.

As per "Plastic Waste Recycling methodology, PWRM0002, V 1.1.", the baseline recycled plastic waste is calculated as follows:

Baseline recycling: Equation (1)

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

$B_{recycled,y}$ = Baseline amount of recycled plastic waste in year y (tonnes)

$B_{p,recycled,i,y}$ = Baseline amount of recycled plastic waste of material type i in year y (tonnes) without depolymerization

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

$B_{dp,recycled,i,y}$ = Baseline amount of recycled plastic waste in the form of depolymerized plastics from material type i in year y (tonnes).

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

The proposed project activity is a capacity addition to an existing recycling activity. The facility had two capacity additions of 2,112 tonnes/year in first and third year.

Baseline Recycled plastic waste

As per PWRM0002 Plastic Waste Recycling Methodology, v1.1, baseline recycling is equal to the average annual recycling rate of each material type over the three-year period prior to the start of the project activity; The baseline recycling for each material type is included as follows.

Year	Estimated baseline recycled plastic waste - PET (tonnes)	Adjustment factor	Estimated Baseline plastic waste - PET (tonnes)
2015	855	1	855
2016	812	1	812
2017	770	1	769
		3-year average recycled waste	**812**

Year	Estimated baseline recycled plastic waste - PVC (tonnes)	Adjustment factor	Estimated Baseline plastic waste - PVC (tonnes)
2015	1,828	1	1,827
2016	1,924	1	1,924
2017	1,732	1	1,731
		3-year average recycled waste	1,827

Year	Estimated baseline recycled plastic waste - PP (tonnes)	Adjustment factor	Estimated Baseline plastic waste - PP (tonnes)
2015	750	1	749
2016	791	1	791
2017	833	1	833
		3-year average recycled waste	791

Year	Estimated baseline recycled plastic waste - PS (tonnes)	Adjustment factor	Estimated Baseline plastic waste - PS (tonnes)
2015	596	0.04	23
2016	629	0.04	25
2017	662	0.04	26
		3-year average recycled waste	24

4.2 Project Collected and/or Recycled Plastic Waste

Project recycled plastic waste is the amount of plastic waste that is recycled by the project activity.

As per "Plastic Waste Recycling methodology, PWRM0002, V 1.1.", Project recycled plastic waste is calculated as follows:

Project recycling: Equation (2)

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

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

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

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

$P_{dp,recycled,i,y}$ = Amount of plastic waste in the form of depolymerized plastics of material type i recycled by the project activity in year y (tonnes).

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

The proposed project activity is a capacity addition to an existing recycling activity. The facility had two capacity additions of 2,112 tonnes/year in first and third year. As the project does not involve any depolymerization process, $P_{dp,recycled,i,y}$ and mass fraction is zero. Project recycled waste for each type is calculated as given below.

Year	Estimated project recycled plastic waste - PET (tonnes)	Adjustment factor	Estimated Baseline plastic waste - PET (tonnes)
2018	1,277	1	1,277
2019	1,277	1	1,277
2020	1,277	1	1,277
2021	1,700	1	1,700
2022	1,700	1	1,700
2023	1,700	1	1,700
2024	1,700	1	1,700

2025	1,700	1	1,700
2026	1,700	1	1,700
2027	1,700	1	1,700
Total	**15,731**		**15,731**

Year	Estimated project recycled plastic waste - PVC (tonnes)	Adjustment factor	Estimated Baseline plastic waste - PVC (tonnes)
2018	2,874	1	2,874
2019	2,874	1	2,874
2020	2,874	1	2,874
2021	3,825	1	3,825
2022	3,825	1	3,825
2023	3,825	1	3,825
2024	3,825	1	3,825
2025	3,825	1	3,825
2026	3,825	1	3,825
2027	3,825	1	3,825
Total	**35,397**		**35,397**

Year	Estimated project recycled plastic waste - PP (tonnes)	Adjustment factor	Estimated Baseline plastic waste - PP (tonnes)
2018	960	1	960
2019	960	1	960
2020	960	1	960
2021	1,277	1	1,277
2022	1,277	1	1,277
2023	1,277	1	1,277
2024	1,277	1	1,277
2025	1,277	1	1,277
2026	1,277	1	1,277
2027	1,277	1	1,277
Total	**11,819**		**11,819**

Year	Estimated project recycled plastic waste - PS (tonnes)	Adjustment factor	Estimated Baseline plastic waste - PS (tonnes)
2018	1,275	0.04	51
2019	1,275	0.04	51
2020	1,275	0.04	51
2021	1,697	0.04	67
2022	1,697	0.04	67
2023	1,697	0.04	67
2024	1,697	0.04	67
2025	1,697	0.04	67
2026	1,697	0.04	67
2027	1,697	0.04	67
Total	**15,704**		**622**

4.3 Net Collected and/or Recycled Plastic Waste

Net recycled plastic waste is calculated as follows:

Net recycling: Equation (3)

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

$N_{recycled,y}$ = Net recycled plastic waste in year y (tonnes)

The net recycled waste for each type is calculated as given below.

Year	Estimated baseline recycled plastic waste - PET (tonnes)	Estimated project recycled plastic waste - PET (tonnes)	Estimated net recycled plastic waste - PET (tonnes)
2018	812	1,277	465
2019	812	1,277	465
2020	812	1,277	465
2021	812	1,700	888
2022	812	1,700	888
2023	812	1,700	888

2024	812	1,700	888
2025	812	1,700	888
2026	812	1,700	888
2027	812	1,700	888
Total	**8,120**	**15,731**	**7,611**

Year	Estimated baseline recycled plastic waste - PVC (tonnes)	Estimated project recycled plastic waste - PVC (tonnes)	Estimated net recycled plastic waste - PVC (tonnes)
2018	1,827	2,874	1,047
2019	1,827	2,874	1,047
2020	1,827	2,874	1,047
2021	1,827	3,825	1,998
2022	1,827	3,825	1,998
2023	1,827	3,825	1,998
2024	1,827	3,825	1,998
2025	1,827	3,825	1,998
2026	1,827	3,825	1,998
2027	1,827	3,825	1,998
Total	**18,270**	**35,397**	**17,127**

Year	Estimated baseline recycled plastic waste - PP (tonnes)	Estimated project recycled plastic waste - PP (tonnes)	Estimated net recycled plastic waste - PP (tonnes)
2018	791	960	169
2019	791	960	169
2020	791	960	169
2021	791	1,277	486
2022	791	1,277	486
2023	791	1,277	486
2024	791	1,277	486
2025	791	1,277	486
2026	791	1,277	486
2027	791	1,277	486
Total	**7,910**	**11,819**	**3,909**

Year	Estimated Baseline plastic waste - PS (tonnes)	Estimated project recycled plastic waste - E-waste (tonnes)	Estimated net recycled plastic waste - PS (tonnes)
2018	24	51	27
2019	24	51	27
2020	24	51	27
2021	24	67	43
2022	24	67	43
2023	24	67	43
2024	24	67	43
2025	24	67	43
2026	24	67	43
2027	24	67	43
Total	**240**	**622**	**382**

5 MONITORING

5.1 Data and Parameters Available at Validation (3.12)

Data / Parameter	$B_{,recycled,i,y}$
Unit	*Tonnes/year*
Description	*Amount of material type i recycled in the baseline in year y*
Equation	*Equation (2)*
Value	

Material type	*Baseline amount of recycled waste (tonnes)*
PET	*812*
PVC	*1827*
PP	*791*
PS	*24*

Source of data	*Previous annual operational data*
Justification of choice of data or description of measurement methods and procedures applied	Baseline recycling is calculated as equal to the average annual recycling rate over the three-year period prior to the start of the project activity;
Purpose	*Calculation of baseline recycled plastic waste for capacity addition projects*
Comments	-

Data / Parameter	$B_{p,recycled,i,y}$
Unit	*Tonnes/year*
Description	*Amount of material type i recycled without depolymerization in the baseline in year y*
Equation	*Equation (2)*
Value	*Material type* / *Baseline amount of recycled waste (tonnes)* *PET* / *812* *PVC* / *1827* *PP* / *791* *PS* / *629*
Source of data	*Previous annual operational data*
Justification of choice of data or description of measurement methods and procedures applied	Baseline recycling is calculated as equal to the average annual recycling rate over the three-year period prior to the start of the project activity;
Purpose	*Calculation of baseline recycled plastic waste for capacity addition projects*
Comments	-

5.2 Data and Parameters Monitored (3.12)

Data / Parameter	*Sorting output*
Unit	Tonnes/year
Description	*Quantity of sorted plastic waste of each material type i*
Equation	-
Source of data	*Direct measurement at project facility*
Description of measurement methods and procedures applied	*Measurement of each material type i with weighing scales and data entry after sorting of waste*
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	*Calibration of weighing scales according to the equipment manufacturer's specifications or at least every three years.*
Purpose	*Monitoring for compliance with Applicability Condition 4 for sorting as per the methodology*
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*
Unit	-
Description	*List of input materials to the recycling process.*
Equation	-

Source of data	*Direct measurement at project facility*
Description of measurement methods and procedures applied	-
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	*Where hazardous material is found in the input to the recycling process, it must be eliminated from the process following national, regional and local regulations.*
Purpose	*Monitoring for compliance with Applicability Condition 5 for sorting as per the methodology*
Comments	-

Data / Parameter	$P_{p,recycled,i,y}$
Unit	*Tonnes/year*
Description	*Amount of plastic waste of material type i recycled by the project activity in year y (tonnes) without depolymerization*
Equation	*Equation (2)*
Value	

Year	PET	PVC	PP	PS
2018	1,277	2,874	960	1,275
2019	1,277	2,874	960	1,275
2020	1,277	2,874	960	1,275
2021	1,700	3,825	1,277	1,697
2022	1,700	3,825	1,277	1,697
2023	1,700	3,825	1,277	1,697
2024	1,700	3,825	1,277	1,697
2025	1,700	3,825	1,277	1,697
2026	1,700	3,825	1,277	1,697

	2027	1,700	3,825	1,277	1,697
Source of data	*Direct measurement at project facility*				
Description of measurement methods and procedures applied	*Measurement of each material type i with weighing scales after the final stage at the recycling facility, before leaving the project site or being used for manufacturing products on site*				
Frequency of monitoring/recording	*Annual*				
Quality Assurance/Quality Control (QA/QC) procedures to be applied	*Calibration of weighing scales*				
Purpose	*Calculation of project recycled plastic waste*				
Comments	-				

Data / Parameter	End destination of non-recycled plastic waste
Unit	-
Description	End destination of plastic waste that enters the project recycling facility and is not recycled or is lost during the recycling process
Equation	-
Value	-
Source of data	Contractual agreements
Description of measurement methods and procedures applied	-
Frequency of monitoring/recording	Annual

Quality Assurance/Quality Control (QA/QC) procedures to be applied	If waste contains hazardous substances, it must be managed through environmentally and socially appropriate technologies and processes in accordance with the relevant national, regional or local regulations and guidelines.
Purpose	Monitoring for compliance with Applicability Condition 11 in Section 4
Comments	

Data / Parameter	End destination of non-plastic waste from recycling facility
Unit	-
Description	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 processes.
Equation	-
Value	-
Source of data	Contractual agreements
Description of measurement methods and procedures applied	-
Frequency of monitoring/recording	Annual
Quality Assurance/Quality Control (QA/QC) procedures to be applied	If waste contains hazardous substances, it must be managed through environmentally and socially appropriate technologies and processes in accordance with the relevant national, regional or local regulations and guidelines.

Purpose	Monitoring for compliance with Applicability Condition 11 in Section 4
Comments	

Data / Parameter	AF_i
Unit	-
Description	Adjustment factor for composite material i
Equation	*Equation (1). Equation (2)*
Value	*Material type* / Adjustment factor for composite material *PET* / *1* *PVC* / *1* *PP* / *1* *PS* / *0.04*
Source of data	Methodology default value
Description of measurement methods and procedures applied	Calculated based on sampling as per the latest version of the CDM's Standard: Sampling and surveys for CDM project activities and programmes of activities
Frequency of monitoring/recording	Every 6 months
Quality Assurance/Quality Control (QA/QC) procedures to be applied	-
Purpose	Calculation of baseline recycled plastic waste Calculation of project recycled plastic waste
Comments	

5.3 Monitoring Plan (3.12.3 – 3.12.5)

The project proponent uses timely data management and accounting for documentation of data and procedures followed at the plant. All plant employees and stakeholders present in the chain of the project activity are made aware of the project requirements. There are regular cross-checks at various steps along the recycling activity.

Data collection and archiving

The weights of waste entering the plant and recycled products are recorded and stored in logs as well as in electronic form on a daily basis. The records are checked periodically by the plant manager and discussed thoroughly with the plant supervisor.

Emergency preparedness

The project activity does not result in any unidentified activity that can result in an overestimation of credits. In the event of a malfunction, plant operations shall be stopped and resumed when the malfunctioning equipment is checked or replaced with new machinery. The weighing scales are regularly calibrated as per national regulations. No other need for emergency preparedness in data monitoring is visualized.

Personnel training

In order to ensure the proper functioning of the project activity and the proper monitoring of waste handled, the staff is trained. The plant helpers are trained in equipment operation, data recording, report writing, operation and maintenance, and emergency procedures in compliance with the monitoring plan.

6 IMPLEMENTATION STATUS

6.1 Implementation Status of the Project Activity

The facility started operation before 2016. The initial capacity of the project was 4,276 tonnes/year. The capacity addition was completed through purchase of machinery primarily extrusion lines. The capacity addition was completed in multiple stages and over the years as followed.

2018 – Total annual recycling capacity was upgraded to 6,388 tonnes/year

2021 - Total annual recycling capacity was upgraded to 8,500 tonnes/year

Between 2018 and 2023, the facility has recycled over 10,000 tonnes of plastic waste

The material type recycled waste is as provided below,

Year	Amount of plastic waste recycled (tonnes)			
	PET	PVC	PP	PS
2018	1,114	2,507	837	1,112
2019	1,114	2,507	837	1,112
2020	1,114	2,507	837	1,112
2021	1,482	3,335	1,114	1,480
2022	1,482	3,335	1,114	1,480
2023	1,482	3,335	1,114	1,480

6.1.1 Implementation Schedule

First verification is expected during the year 2024

6.1.2 Description of Next Stage (Optional)

Not applicable

7 QUANTIFICATION OF COLLECTED AND/OR RECYCLED PLASTIC WASTE

7.1 Data and Parameters Monitored

Data / Parameter	Sorting output					
Unit	Tonnes/year					
Value	***Year***	***PET***	***PVC***	***PP***	***PS***	***Total***
	2018	*1336*	*3008*	*1004*	*1334*	*6682*
	2019	*1336*	*3008*	*1004*	*1334*	*6682*
	2020	*1336*	*3008*	*1004*	*1334*	*6682*
	2021	*1778*	*4002*	*1336*	*1776*	*8892*

	2022 1778 4002 1336 1776 8892 *2023 1778 4002 1336 1776 8892* ***Total 9342 21030 7020 9330 46722***
Description	*Measurement of each material type i with weighing scales and data entry after sorting of 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
Unit	-
Value	*List of input materials* *Plastic Waste Material: PET, PVC, PP and PS* *Plastic resin* *Washing soda*
Description	*List of input materials to the recycling process.*
Comments	

Data / Parameter	$P_{p,recycled,i,y}$
Unit	*Tonnes/year*
Value	***Year PET PVC PP PS*** *2018 1,114 2,507 837* ***1,112*** *2019 1,114 2,507 837* ***1,112*** *2020 1,114 2,507 837* ***1,112*** *2021 1,482 3,335 1,114* ***1,480*** *2022 1,482 3,335 1,114* ***1,480*** *2023 1,482 3,335 1,114* ***1,480*** ***Total 7,788 17,526 5,853 7,776***
Description	*Amount of plastic waste of material type i recycled by the project activity in year y (tonnes) without depolymerization*

Comments	

Data / Parameter	*End destination of non-recycled plastic waste*
Unit	-
Value	***Year*** ***Quantity*** *2018* *221* *2019* *221* *2020* *221* *2021* *295* *2022* *295* *2023* *295* ***Total*** ***1548***
Description	End destination of plastic waste that enters the project recycling facility and is not recycled or is lost during the recycling process.
Comments	

Data / Parameter	*End destination of non-plastic waste from recycling facility*
Unit	-
Value	***Year*** ***Quantity*** *2018* *887* *2019* *887* *2020* *887* *2021* *1182* *2022* *1182* *2023* *1182* ***Total*** ***6207***
Description	*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.
Comments	

Data / Parameter	AF_i
Unit	
Value	*Material type* / Adjustment factor for composite material *PET* / *1* *PVC* / *1* *PP* / *1* *PS* / *0.04*
Description	*Adjustment factor for composite material i*
Comments	

7.2 Monitoring Results

Between 2018 and 2023, the facility has recycled over 10,000 tonnes of plastic waste

The material type recycled waste is as provided below,

Year	Amount of plastic waste recycled (tonnes)			
	PET	PVC	PP	PS
2018	1,114	2,507	837	1,112
2019	1,114	2,507	837	1,112
2020	1,114	2,507	837	1,112
2021	1,482	3,335	1,114	1,480
2022	1,482	3,335	1,114	1,480

2023	1,482	3,335	1,114	1,480

The project activity has generated 10,752 credits in the period from 01-01-2018 to 31-12-2023.

The generated quantity of credits as per material type are as follows

Year	Amount of plastic waste recycled (tonnes)				
	PET	PVC	PP	PS	Total
2018	302	680	46	20	1,048
2019	302	680	46	20	1,048
2020	302	680	46	20	1,048
2021	670	1,508	323	35	2,536
2022	670	1,508	323	35	2,536
2023	670	1,508	323	35	2,536
Total	2,916	6,564	1,107	165	10,752

7.3 Baseline Collected and/or Recycled Plastic Waste

Baseline recycled plastic waste is the amount of plastic waste that would have been recycled in the absence of the project activity.

As per "Plastic Waste Recycling methodology, PWRM0002, V 1.1.", the baseline recycled plastic waste is calculated as follows:

Baseline recycling: Equation (1)

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

$B_{recycled,y}$ = Baseline amount of recycled plastic waste in year y (tonnes)

$B_{p,recycled,i,y}$ = Baseline amount of recycled plastic waste of material type i in year y (tonnes) without depolymerization

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

$B_{dp,recycled,i,y}$ = Baseline amount of recycled plastic waste in the form of depolymerized plastics from material type i in year y (tonnes).

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

The proposed project activity is a capacity addition to an existing recycling activity. The facility had two capacity additions of 2,112 tonnes/year in first and third year

Baseline Recycled plastic waste

As per PWRM0002 Plastic Waste Recycling Methodology, v1.1, baseline recycling is equal to the average annual recycling rate of each material type over the three-year period prior to the start of the project activity; The baseline recycling for each material type is included as follows.

Year	Estimated baseline recycled plastic waste - PET (tonnes)	Adjustment factor	Estimated Baseline plastic waste - PET (tonnes)
2015	855	1	855
2016	812	1	812
2017	770	1	769
		3-year average recycled waste	**812**

Year	Estimated baseline recycled plastic waste - PVC (tonnes)	Adjustment factor	Estimated Baseline plastic waste - PVC (tonnes)
2015	1,828	1	1,827
2016	1,924	1	1,924
2017	1,732	1	1,731
		3-year average recycled waste	1,827

Year	Estimated baseline recycled plastic waste - PP (tonnes)	Adjustment factor	Estimated Baseline plastic waste - PP (tonnes)
2015	750	1	749
2016	791	1	791
2017	833	1	833

		3-year average recycled waste	791

Year	Estimated baseline recycled plastic waste - PS (tonnes)	Adjustment factor	Estimated Baseline plastic waste - PS (tonnes)
2015	596	0.04	23
2016	629	0.04	25
2017	662	0.04	26
		3-year average recycled waste	24

7.4 Project Collected and/or Recycled Plastic Waste

Project recycled plastic waste is the amount of plastic waste that is recycled by the project activity.

As per "Plastic Waste Recycling methodology, PWRM0002, V 1.1.", Project recycled plastic waste is calculated as follows:

Project recycling: Equation (2)

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

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

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

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

$P_{dp,recycled,i,y}$ = Amount of plastic waste in the form of depolymerized plastics of material type i recycled by the project activity in year y (tonnes).

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

The proposed project activity is a capacity addition to an existing recycling activity. The facility had two capacity additions of 2,112 tonnes/year in first and third year.

The proposed project activity is a capacity addition to an existing recycling activity. The facility had two capacity additions of 2,112 tonnes/year in first and third year. As the project does not

involve any depolymerization process, $Pdp,recycled,i,y$ and mass fraction is zero. Project recycled waste for each type is calculated as given below.

Year	Estimated project recycled plastic waste - PET (tonnes)	Adjustment factor	Estimated Baseline plastic waste - PET (tonnes)
2018	1,114	1	1,114
2019	1,114	1	1,114
2020	1,114	1	1,114
2021	1,482	1	1,482
2022	1,482	1	1,482
2023	1,482	1	1,482
		Total	7,788

Year	Estimated project recycled plastic waste - PVC (tonnes)	Adjustment factor	Estimated Baseline plastic waste - PVC (tonnes)
2018	2,507	1	2,507
2019	2,507	1	2,507
2020	2,507	1	2,507
2021	3,335	1	3,335
2022	3,335	1	3,335
2023	3,335	1	3,335
		Total	17,526

Year	Estimated project recycled plastic waste - PP (tonnes)	Adjustment factor	Estimated Baseline plastic waste - PP (tonnes)
2018	837	1	837
2019	837	1	837
2020	837	1	837
2021	1,114	1	1,114
2022	1,114	1	1,114

2023	1,114	1	1,114
		Total	5,853

Year	Estimated project recycled plastic waste - PS-waste (tonnes)	Adjustment factor	Estimated Baseline plastic waste - PS (tonnes)
2018	1,112	0.04	44
2019	1,112	0.04	44
2020	1,112	0.04	44
2021	1,480	0.04	59
2022	1,480	0.04	59
2023	1,480	0.04	59
		Total	309

7.5 Net Collected and/or Recycled Plastic Waste

: Net recycled plastic waste is calculated as follows:

Net recycling: Equation (3)

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

$N_{recycled,y}$ = Net recycled plastic waste in year y (tonnes)

The net recycled plastic waste between 2018 and 2023 is given below

Year	Estimated baseline recycled plastic waste - PET (tonnes)	Estimated project recycled plastic waste - PET (tonnes)	Estimated net recycled plastic waste - PET (tonnes)
2018	812	1,114	302
2019	812	1,114	302
2020	812	1,114	302
2021	812	1,482	670
2022	812	1,482	670
2023	812	1,482	670

		Total	**2,916**

Year	Estimated baseline recycled plastic waste - PVC (tonnes)	Estimated project recycled plastic waste - PVC (tonnes)	Estimated net recycled plastic waste - PVC (tonnes)
Year 1	1,827	2,507	680
Year 2	1,827	2,507	680
Year 3	1,827	2,507	680
Year 4	1,827	3,335	1,508
Year 5	1,827	3,335	1,508
Year 6	1,827	3,335	1,508
		Total	**6,564**

Year	Estimated baseline recycled plastic waste - PP (tonnes)	Estimated project recycled plastic waste - PP (tonnes)	Estimated net recycled plastic waste - PP (tonnes)
Year 1	791	837	46
Year 2	791	837	46
Year 3	791	837	46
Year 4	791	1,114	323
Year 5	791	1,114	323
Year 6	791	1,114	323
		Total	**1,107**

Year	Estimated Baseline plastic waste -PS (tonnes)	Estimated project recycled plastic waste - E-waste (tonnes)	Estimated net recycled plastic waste - PS (tonnes)
Year 1	24	44	20
Year 2	24	44	20
Year 3	24	44	20
Year 4	24	59	35
Year 5	24	59	35

Year 6	24	59	35
		Total	**165**

8 APPENDIX

Will be updated later