Plastic Standard

Plastic Waste Reduction Program Methodology

PWRM0001

PLASTIC WASTE COLLECTION METHODOLOGY

Version 1.0

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This methodology was developed by:

CONTENTS

1 SOURCES

This methodology references certain procedures set out in the following methodologies and tools:

- Clean Development Mechanism (2018). *AMS-III.AJ. Small-scale methodology: Recovery and recycling of materials from solid wastes, version 07.0*
- Clean Development Mechanism (2018). *AMS-III.BA. Small-scale methodology: Recovery and recycling of materials from e-waste, version 02.0*
- Clean Development Mechanism (2013). *ACM0003. Large-scale consolidated methodology: Partial substitution of fossil fuels in cement or quicklime manufacture, version 08.0*
- Clean Development Mechanism (2014). *ACM0022. Large-scale consolidated methodology: Alternative waste treatment processes, version 02.0*
- Clean Development Mechanism (2019). *CDM-MP80-A17. Concept note: Consistent use of market share, market saturation, market penetration and penetration rate, version 01.0*
- Clean Development Mechanism (2012). *Methodological tool 01: Tool for the demonstration and assessment of additionality, version 07.0.0*
- Clean Development Mechanism (2009). *Methodological tool 10: Tool to determine the remaining lifetime of equipment, version 01*
- Clean Development Mechanism (2018). *Methodological tool 19: Demonstration of additionality of microscale project activities, version 09.0*
- Clean Development Mechanism (2015). *Methodological tool 24: Common practice, version 03.1*
- Clean Development Mechanism (2019). *Methodological tool 27: Investment analysis, version 10.0*
- Verified Carbon Standard (2012). *Approved VCS methodology VM0018: Energy efficiency and solid waste diversion activities within a sustainable community, version 1.0*

The following have also informed the development of this methodology:

- Ellen MacArthur Foundation and CE100 (2019). *Enabling a Circular Economy for Chemicals with the Mass Balance Approach – A White Paper from Co.Project Mass Balance*
- *ISO 15270:2008 Plastics – Guidelines for the recovery and recycling of plastics waste*
- Ocean Conservancy and McKinsey Center for Business and Environment (2015). *Stemming the Tide: Land-based Strategies for a Plastic-free Ocean*
- Verified Carbon Standard (2013). *Guidance for Standardized Methods, version 3.3*
- Verified Carbon Standard (2019). *Methodology Requirements, version 4.0*

2 SUMMARY DESCRIPTION OF THE METHODOLOGY

Additionality and crediting methods	
Additionality	Activity and project methods
Crediting baseline	Project method

This methodology provides procedures to estimate the additional plastic waste[1] removed or diverted from the environment through informal and formal activities that aim to prevent plastic waste from remaining in or ending up in the environment.

Projects that result in both collection and recycling of plastic waste shall apply this methodology in conjunction with an approved recycling methodology to demonstrate additionality and quantify the plastic waste collected and recycled by the respective activities.

Sections that are not applicable to projects using the *Plastic Waste Reduction Standard (Plastic Standard)* only to account for the results of their collection activities and not to issue Waste Collection Credits are marked as such.[2]

3 DEFINITIONS

In addition to those set out in the *Plastic Waste Reduction Program Definitions*, the following definitions apply to this methodology:

Appropriate end destination
Eligible end-of-life option under the methodology. See Applicability Condition 7 in Section 4 for a list of appropriate end destinations.

Capacity addition
An investment to increase the capacity of an existing collection activity through the addition, replacement or modification of equipment, infrastructure and/or the collection process

Collection activity
An activity that is considered eligible under this methodology in accordance with Applicability Condition 1 in Section 4. Collection activities may include informal and/or formal sector activities.

[1] In this document, the term plastic waste refers to all waste that includes materials under the scope of the Plastic Waste Reduction Program (Plastic Program), including composite materials (e.g., used beverage cartons).
[2] In this *Plastic Waste Collection Methodology, v1.0*, this is Section 7.

Contaminant
Unwanted substance or material. Contaminants may include, but are not limited to, liquids, organic matter, and other plastic types and materials.

Cracking[3]
The process of breaking up long hydrocarbon molecules into smaller, more useful molecules. This process converts heavy straight run liquids into gasoline.

Depolymerization
The chemical reversion of a polymer to its monomer(s) or to a polymer of lower relative molecular mass (*ISO 15270:2008 Plastics – Guidelines for the recovery and recycling of plastics waste*)

Dumpsite
An area of land where waste materials are dumped under uncontrolled conditions

Extended producer responsibility (EPR)[4]
A policy approach under which producers are given a significant financial and/or physical responsibility for the treatment or disposal of post-consumer products

Formal waste sector activities (formal sector or formal activities)[5]
Waste management activities planned, sponsored, financed, carried out or regulated and/or recognized by the local authorities or their agents, usually through contracts, licenses or concessions

Gasification[6]
The process of thermal decomposition of organic compounds at high temperatures, typically more than 800 °C. Gasification converts organic compounds of both biogenic and fossil origin into combustible gas (e.g., syngas). This can be used for electric power generation or converted into fuel or chemical feedstocks (e.g., ethanol and methanol). Such feedstocks can be used to make new plastics for consumer products.

[3] American Petroleum Institute (n.d.). *Refinery Processes.* Available at: https://www.api.org/oil-and-natural-gas/wells-to-consumer/fuels-and-refining/refineries/how-refinery-works/refinery-processes.
[4] Organisation for Economic Co-operation and Development (n.d.). *Extended Producer Responsibility.* Available at: https://www.oecd.org/env/tools-evaluation/extendedproducerresponsibility.htm.
[5] Adapted from CDM (2018). *AMS-III.AJ. Small-scale methodology: Recovery and recycling of materials from solid wastes, version 07.0.* Available at: https://cdm.unfccc.int/methodologies/DB/R22750M155F84YR0D4YVYOS0CLSCII.
[6] Adapted from CDM (2014). *ACM0022 Large-scale consolidated methodology: Alternative waste treatment processes, version 02.0.* Available at: https://cdm.unfccc.int/methodologies/DB/YINQ0W7SUY002S6GU8E5DYVP2ZC2N3.

Incineration[7]

The controlled combustion of organic compounds of both biogenic and fossil origin with or without heat capture and utilization, that meets applicable and proposed emission limits and other environmental regulatory constraints. Ideally, all the organic content is converted into CO_2 and H_2O. Practically, since the process of combustion is incomplete and inert matter is usually present in the combusted waste, ash is an important by-product of the process.

Informal waste sector activities (informal sector or informal activities)[8]

Waste management activities carried out by individuals or a group of individuals who are not formally registered or regulated by local authorities or formally responsible for providing waste management services. Newly established formalized organizations of such individuals, for example, cooperatives, social enterprises and programs led by non-governmental organizations (NGOs), can also be considered the informal sector for the purpose of this methodology.

New activity

Initiation of a new collection activity at a site where the collection activity did not exist prior to project implementation

Open burning of waste[9]

Uncontrolled waste combustion practices, including dump fires, pit burning, fires on bare soil and barrel burning. Open burning is characterized by burning at low temperatures (between 250 °C and 700 °C) and in oxygen-deprived environments, leading to incomplete combustion of waste. It also refers to burning conducted in a manner such that combustion exhaust is not effectively controlled and combustion products are not vented through a stack or chimney. The following burning practices are included in this definition:

- **Residential open burning:** The indiscriminate burning by individuals of waste that is never collected or is collected and dumped away from dumpsites. This can occur just outside the home or in places where waste is illegally dumped, such as roadsides or other open public spaces. Occurs primarily due to its convenience and a lack of sufficient collection systems.
- **Deliberate open burning in landfills and at open dumpsites:** Waste in landfills and open dumpsites is often burned to reduce its volume when these sites are filled beyond their capacity or have an unknown, and likely insufficient, capacity due to the lack of planning involved in their establishment.

[7] Ibid. including an addition from National Research Council (US) Committee on Health Effects of Waste Incineration (2000). Incineration processes and environmental releases. In: *Waste Incineration & Public Health.* Available at: https://www.ncbi.nlm.nih.gov/books/NBK233627/.
[8] Adapted from CDM (2018). *AMS-III.AJ. Small-scale methodology: Recovery and recycling of materials from solid wastes, version 07.0.* Available at: https://cdm.unfccc.int/methodologies/DB/R22750M155F84YR0D4YVYOS0CLSCII.
[9] R20 Regions of Climate Action (2016). *Open Burning of Waste: A Global Health Disaster*. Available at: https://regions20.org/wp-content/uploads/2016/08/OPEN-BURNING-OF-WASTE-A-GLOBAL-HEALTH-DISASTER_R20-Research-Paper_Final_29.05.2017.pdf.

- **Spontaneous open burning in landfills and at open dumpsites:** Fires can occur spontaneously and unintentionally in large piles of trash within open dumpsites and landfills. These fires are likely caused by the lack of waste treatment, other than burning, that occurs in these disposal areas.

Refuse-derived fuel (RDF)[10]
A fuel which is derived from the mechanical and/or thermal treatment of waste and which is used in an incineration or co-incineration process. RDF is produced by shredding and dehydrating solid waste with a waste converter technology.

Region
The spatial extent that covers preferably the geographic area containing the source of the plastic waste, the project activity, and the end destination of the plastic waste collected and/or recycled by the project activity; and at most covers the host country or countries in which the project activity and the end destination are located. The applicable geographic area may be an administrative unit (e.g., municipality, district, state or country), based on the availability of data.

Waste disposal
The deposit of waste on land or in water for an indefinite period

Waste processing (processing)[11]
Conversion of sorted materials into secondary materials to substitute for virgin materials (in the case of mechanical recycling) or for other end applications (e.g., co-processing) as deemed suitable. The process can include manual, mechanical and electro-chemical processes and technologies.

[10] CDM (2014). *ACM0022. Large-scale consolidated methodology: Alternative waste treatment processes, version 02.0.* Available at: https://cdm.unfccc.int/methodologies/DB/YINQ0W7SUYO02S6GU8E5DYVP2ZC2N3.
[11] Adapted from CDM (2018). *AMS-III.BA. Small-scale methodology: Recovery and recycling of materials from e-waste, version 02.0.* Available at: https://cdm.unfccc.int/methodologies/DB/PVHQ5T7VGCTO07EUHFU517J4HNW21Q.

4 APPLICABILITY CONDITIONS

This methodology is applicable when all of the following conditions are met:

1) Project activities result in plastic waste collection from the environment through one or more of the following activities:

    a) Informal collection: Collection of plastic waste by the informal sector for recycling or other waste management purposes

    b) Formal collection: Collection of plastic waste streams under the ownership and oversight of the formal sector for recycling or other waste management purposes. There may be participation of the informal sector in some activities of the value chain, but the ownership and management of the project activity lies with the relevant local authorities (e.g., government, quasi-government[12]).

    Plastic waste collection activities may include sub-activities such as sorting, shredding, decontamination or melting prior to transferring the waste material to the next relevant entity in the value chain.

    See Appendix I for examples of project activities that could be eligible under this methodology.

2) The collection activity is a new activity or a capacity addition activity resulting in an increase in the total capacity of the collection activity. The collection process may be accomplished manually or by electro-mechanical equipment (automatic or semi-automatic).

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 (including open burning, dumpsites) or incinerated without energy recovery in the absence of the project activity. This can be demonstrated by using the most recent official government data, third-party independent surveys and research, academic research/papers, independent market research or data from industry bodies or local authorities.

4) The collected waste is disposed of directly in a landfill, or transferred directly (with or without commercial transactions) to a processing/recycling/manufacturing facility or to a chain of intermediary agencies that transfer the material to an appropriate end destination (e.g., identifiable processing/recycling/manufacturing facilities and/or landfills).

[12] A quasi-government organization is an entity in the private sector that is supported by the government with a public mandate to provide a given service. Examples include public corporations such as telephone companies and water utilities.

5) The dry weight[13] of the final output of collected plastic waste that reaches an appropriate end destination is directly measured and recorded. Where it is not possible to directly measure the output, measurement records may be obtained from the end destination (i.e., the purchasing or receiving entity of the collected plastic waste). Evidence such as sales invoices generated by the project proponent or goods receipt notes generated by the plastic waste recipient are acceptable records for accounting purposes.

6) The output of the collection activity is not used in any unauthorized, illegal or non-statutory activities within the project boundary (e.g., the manufacturing of products that do not conform to the quality criteria set by the relevant statutory/regulatory bodies, including the manufacturing of unauthorized products in a planned manner or as exceptions/rejects in the production line). This can be achieved by monitoring the output of the collection activity and demonstrating that collected waste goes to an authorized or licensed entity. Contractual documents between the project proponent and the recipient of the collected waste are sufficient to demonstrate the same.

7) The material collected in the project activity is taken to one or more of the end-of-life destinations listed below, referred to as appropriate end destinations throughout this methodology. Compliance of the activities of the end destination facility with relevant local or national regulations shall be demonstrated.

    - **Reprocessing:** May include using the collected plastic waste in, among others, construction materials (e.g., pavement tiles, plastic bricks), road construction, or other commodities (e.g., decorative craftwork, toys, household items) with commercial value
    - **Mechanical recycling:** Includes both open and closed loop recycling, where the collected waste is reprocessed into a product, a component incorporated into a product or a secondary raw material
    - **Incineration with energy recovery:** Use of plastic waste, including as RDF, as a raw material and/or source of energy to replace natural mineral resources (material recycling) and fossil fuels (energy recovery) in industrial processes (primarily energy intensive industries such as cement production and power generation). The energy recovery facility shall demonstrate successful end use of the recovered energy (i.e., for domestic and/or commercial use by the facility or other parties).
    - **Chemical recycling:**
        - Direct chemical conversion of the collected plastic waste to solid, liquid or gaseous fuel may entail processing the plastic alone or in combination with other materials such as paper or wood. The chemical transformation may involve conversion to products that are used as feedstock in relevant industries.

[13] Dry weight is defined as the difference between the weight of the collected plastic waste and the weight of water content, where the weight of water content can be determined through drying the plastic waste in a vacuum oven (or using other methods) at a temperature lower than the polymer's decomposition temperature and at an adequately high rate of evaporation. Project proponents may use any method to determine the moisture fraction and dry weight that is recognized by an accredited laboratory and/or relevant national/international guidelines.

- The process may involve conversion to monomer or production of new raw materials by changing the chemical structure of plastic waste through cracking, gasification or depolymerization, excluding energy recovery and incineration.
- The process may involve controlled microbiological treatment of biodegradable plastics waste under aerobic or anaerobic conditions (also known as organic or biological recycling).

- **Landfill**: Landfills used as an end destination for plastic waste shall:
  - Be government recognized or affiliated;
  - Have restrictions on access to avoid unauthorized waste scavenging;
  - Have a well-defined boundary;
  - Include at least one of the following: (*i*) mechanical compacting or (*ii*) leveling of the waste;[14]
  - Have periodic cover application (with soil or other material) to remove plastic waste from the influence of the outside environment;
  - Have a leachate drainage system[15] or other reasonable measures to minimize, or preferably avoid, soil and water contamination;
  - Include sanitary lining or other reasonable measures to avoid waste being placed directly on the ground;
  - Have post-closure care requirements such as being capped when closed;
  - Control placement of waste (i.e., to specific areas in the landfill);[16] and
  - Have measures to avoid fires (i.e., to avoid open burning).[17]

8) There is plastic waste available in the region that would not have been collected in the absence of the project. Availability of plastic waste may be demonstrated by, among others, using the most recent publicly available data on plastic waste generation and collection rates in the region to show that there is plastic waste that is not being collected.

9) The project activity does not compete with other collection activities or include plastic waste that has been diverted from a historically existing collection activity. Evidence, such as proof of how the plastic waste was managed over the three-year period prior to implementation of the project activity, shall be provided to demonstrate that the project activity does not divert plastic waste from any historically existing collection activity.

[14] IPCC (2019). Solid waste disposal. In: *Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories Vol. 5*. Available at: https://www.ipcc-nggip.iges.or.jp/public/2019rf/pdf/5_Volume5/19R_V5_3_Ch03_SWDS.pdf.
[15] Ibid.
[16] Ibid.
[17] Ibid.

This methodology is not applicable under the following conditions:

10) Project activities include any of the following end-of-life destinations of plastic waste:

a) Open burning;

b) Dumping on open land;

c) Dumping in water bodies and/or dumpsites; or

d) Incineration without energy recovery.

11) Transboundary movement of collected plastic waste occurs between countries, except in the following circumstance:

a) Projects involve collection of plastic waste in a Least Developed Country (LDC)[18] or Small Island Developing State (SIDS)[19] and its export to any country after completing at least one pre-processing requirement (i.e., sorting by material, removal of impurities, shredding and resizing, identification/testing and/or separation), where the waste is taken to an appropriate end destination in the importing country. A robust and transparent chain of custody from the source of plastic waste in the exporting country to the appropriate end destination shall be provided.

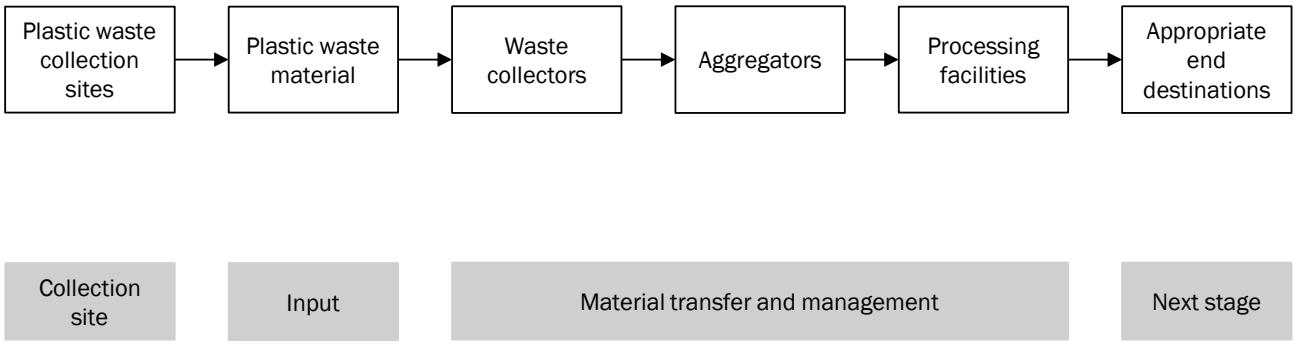
[18] United Nations Conference on Trade and Development (n.d.). *UN List of Least Developed Countries*. Available at: https://unctad.org/en/Pages/ALDC/Least%20Developed%20Countries/UN-list-of-Least-Developed-Countries.aspx.
[19] United Nations Office of the High Representative for the Least Developed Countries, Landlocked Developing Countries and Small Island Developing States (n.d.). *List of SIDS*. Available at: https://www.un.org/ohrlls/content/list-sids.

5 PROJECT BOUNDARY

The spatial extent of the project boundary is shown in Figure 1 and encompasses the following:

1) Plastic waste collection sites (e.g., the environment, dumpsites, households, commercial establishments);
2) Waste collectors;
3) Aggregators;
4) Processing facilities (e.g., material recovery facility, MRF); and
5) Appropriate end destinations (see Applicability Condition 7 in Section 4) of the collected plastic waste.

Figure 1: Spatial extent of the project boundary



6 BASELINE SCENARIO

The baseline scenario 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.

This methodology uses a project method to determine the crediting baseline, as outlined in Section 8.1.

7 DEMONSTRATION OF ADDITIONALITY

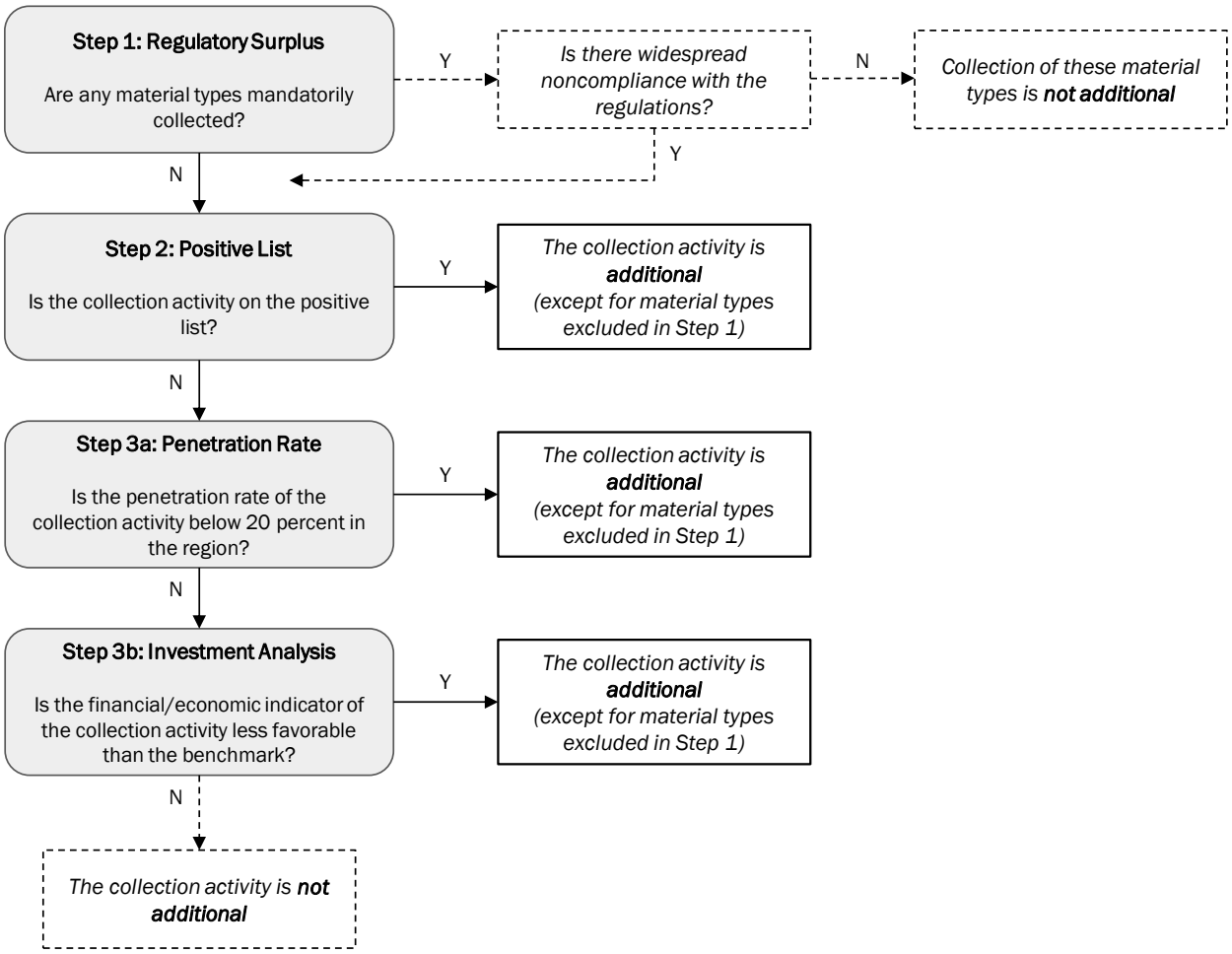
Project proponents applying this methodology must determine additionality using the procedure shown in Figure 2 and described below.

All project proponents must first apply Step 1 to demonstrate regulatory surplus.

Project proponents must then apply Steps 2, 3a or 3b to demonstrate additionality of the project activity. These steps shall be applied sequentially, starting with Step 2 (positive list). If the project activity is not on the positive list and therefore not automatically deemed additional, the project proponent shall proceed to Step 3a (penetration rate). If the penetration rate of the project activity is greater than or equal to 20 percent, the project proponent shall apply Step 3b (investment analysis). Although not mandatory, project proponents may apply more than one of these steps, where possible, to strengthen the demonstration of additionality.

Note – The requirements in this section do not apply to projects that intend to use the Plastic Standard *solely for accounting purposes and not to issue Waste Collection Credits.*

Figure 2: Decision tree for demonstrating additionality



Step 1: Regulatory Surplus

The project proponent shall demonstrate that the project activity proactively exceeds the current regulations or the regulatory compliance scenario and initiates a new collection activity, or expands an existing one, based on the following guidance.

The project proponent shall list all relevant national, regional and local laws and regulations for plastic waste treatment, specific to collection in the relevant region. This does not include national and local policies that do not have a legally binding status. Project proponents shall demonstrate whether, based on an examination of current practice in the region in which the law or regulation applies, those applicable legal or regulatory requirements are systematically enforced and whether non-compliance with those requirements is widespread in the host country. The project proponent may demonstrate widespread noncompliance in the project region by showing that the existing compliance rate is less than 50 percent, and thus even if the project activity complies with the regulation, it meets the regulatory surplus requirement.

The existing rate of compliance with a law or regulation in a given region shall be measured by the total number of relevant entities in the region complying with the law or regulation divided by the total number of relevant entities in the region to whom the law or regulation applies. For example, in the formal sector, if two out of twenty municipal bodies in a state are in compliance with an applicable waste collection regulation, then the compliance rate is 10 percent. The compliance rate may be determined based on primary surveys or from secondary literature published and/or certified by a competent authority.

This list should also include all extended producer responsibility (EPR) schemes relevant to the project activity in the region. The existence of relevant EPR schemes shall not be used to indicate an existing legal requirement for the project activity unless the specific EPR scheme is mandatory. Mandatory schemes may include, among others, those required by law, those that could result in legal redress, and those that enable authorities at the national, regional or local level to require brands or private companies to undertake collection.

Where project activities identify materials collected by type, an assessment shall be conducted for each material type included in the project activity to determine if legal or regulatory requirements for collection are applicable. Collection of a certain material type is not considered additional if it is mandatory. If the project proponent can demonstrate that their project activity will exceed a specific mandatory threshold for collection of a certain material type, then project activities associated with the collection of that material type may be considered additional.

Step 1 outcomes
Outcome 1: There are no laws or regulations that enforce the collection of plastic waste or the laws and regulations are not systematically enforced and noncompliance is widespread (more than 50 percent) in the relevant region. Proceed to Step 2.
Outcome 2: There are laws and/or regulations mandating the collection of some (but not all) of the material types collected in the project activity. Collection of these material types is not additional, unless it can be demonstrated that these laws and regulations are not systematically enforced and noncompliance is widespread (greater than 50 percent) in the relevant region. Exclude the material types for which collection is not additional and proceed to Step 2.
Outcome 3: There are laws and/or regulations mandating the collection of plastic waste (where the project activity identifies the materials collected by type, for all of the material types collected in the project activity). Enforcement of or compliance with these laws and regulations is widespread (greater than 50 percent). The project activity is not additional.

Steps 2, 3a and 3b: Demonstrating Additionality of the Project Activity

Additionality of the project activity shall be demonstrated using one or more of the following three approaches: Steps 2 (positive list), 3a (penetration rate) and/or 3b (investment analysis). These steps shall be applied sequentially, with projects first applying Step 2 (positive list).

Step 2: Activity Method – Positive List[20]

Project activities are deemed automatically additional if they meet the following condition:

1) The project is located in an LDC, SIDS and/or in a Special Underdeveloped Zone (SUZ).[21] 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:
    a) 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;
    b) 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
    c) 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.

Step 2 outcomes
Outcome 1: The project activity is included in the positive list. The project activity is additional (except for any material types excluded in Step 1, where the project identifies materials collected by type).
Outcome 2: The project activity is not included in the positive list. Proceed to Step 3a (penetration rate).

[20] Categories in the positive list have been determined based on the best data available on the extent of plastic waste collection at the time the *Plastic Waste Collection Methodology, v1.0* was developed. Project activities set in a context where the available data indicate that there is high confidence that the project activity will be additional are included in the positive list.
[21] Definition adopted from CDM (2018). *Methodological tool 19: Demonstration of additionality of microscale project activities, version 09.0*. Available at: https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-19-v9.pdf.

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

The project proponent shall assess the penetration rate of collection activities in the relevant region. 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 percent,[22] the project activity is additional.

Any data or studies used in Step 3a to determine the penetration rate shall be no more than three years old at the time of validation.

The penetration rate of the project activity shall be assessed in accordance with the following:

1) For project activities that import plastic waste from other countries (per Applicability Condition 11 in Section 4), the region used in this assessment shall be the entire country in which the end destination of the collection activity is located.

2) The total generation of plastic waste (including composites), *G* (tonnes/year), in the region shall be determined using one of the following approaches:

    a) Publicly available information (e.g., data from governments, local authorities, third-party studies); or
    b) Based on population size in the region and plastic waste generation rates (kg/year per capita). If the project can demonstrate that there is no publicly available data on plastic waste generation rates and it is not reasonable to undertake market research due to a lack of technical, financial or temporal capacity, then the default values included in Table 1 may be applied.

Table 1: Default values for plastic waste generation rates (kg/year per capita)[23]

Country	Urban[24]	Rural[25]
High income	76	76
Upper-middle income	31	21
Lower-middle income	21	11
Lower income	18	9

[22] Following the 20 percent common practice threshold in CDM (2015). *Methodological tool 24: Common practice, version 03.1.* Available at: https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-24-v1.pdf.
[23] The figures in Table 1 were determined using values from Lau, W.W.Y. et al. (2020*). Evaluating scenarios toward zero plastic pollution.* Science 369, 1455-1461. Available at: https://doi.org/10.1126/science.aba9475. Plastic waste generated (Mt; Table S11) is divided by population (in millions; Table S10) in 2016 for each income category for both urban and rural areas. The authors recognize that waste generation and recycling rates may differ among material types, and there are data gaps within their study. The data are based on information from The World Bank and are provided as the most globally applicable dataset available at the time of publication of the *Plastic Waste Collection Methodology, v1.0*. This default dataset may be updated with subsequent revisions of the methodology as more accurate data become widely available.
[24] An administrative unit with a population density of at least 300 inhabitants per square kilometer (European Commission (2020). *A Recommendation on the Method to Delineate Cities, Urban and Rural Areas for International Statistical Comparisons*. Available at: https://unstats.un.org/unsd/statcom/51st-session/documents/BG-Item3j-Recommendation-E.pdf) or as defined in national regulations of the host country.
[25] An administrative unit with a population density of less than 300 inhabitants per square kilometer (European Commission (2020). *A Recommendation on the Method to Delineate Cities, Urban and Rural Areas for International Statistical Comparisons*. Available at: https://unstats.un.org/unsd/statcom/51st-session/documents/BG-Item3j-Recommendation-E.pdf) or as defined in national regulations of the host country.

3) Annual plastic waste collection (including of composite materials), *C* (tonnes/year), in the region shall be determined, based on data from local authorities or independent market research and excluding other plastic collection project activities undergoing validation or that are already registered with the Plastic Program. Where such data are not available, the project proponent shall demonstrate how this collection rate is determined in a credible way.

4) Where the project activity monitors waste collected by material type and includes a specific material type for which reliable, publicly available information indicates that the penetration rate for the material type is higher than the average penetration rate calculated for all material types within the project activity combined, the calculation of the penetration rate shall focus on this material type only.

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

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

(Equation 1)

Step 3a outcomes
Outcome 1: If the project activity has a penetration rate less than 20 percent, the project activity is additional.
Outcome 2: If the project activity has a penetration rate greater than or equal to 20 percent, proceed to Step 3b (investment analysis).

Step 3b: Project Method – Investment Analysis

The objective of the investment analysis is to demonstrate that the project activity is not economically or financially attractive.

The project proponent shall carry out the investment analysis using "Option III: Apply benchmark analysis," including the sensitivity analysis, prescribed in the latest version of the CDM's *Methodological tool 01: Tool for the demonstration and assessment of additionality*. The latest approved versions of the methodological tools for *Demonstration and assessment of additionality* and *Investment analysis* shall be used when applying this step.

The following additional guidance should be taken into account for the investment analysis:

1) The financial/economic indicator, such as internal rate of return (IRR), most suitable for the project type and context shall be identified.

2) Financial analysis shall be based on parameters that are standard in the market and not linked to the subjective profitability expectation or risk profile of a particular project proponent. Where the project activity can only be implemented by the project proponent (e.g., for capacity addition projects), the specific financial situation of the company undertaking the project activity may be considered.

3) All relevant costs[26] and revenues (excluding revenues from Plastic Credits, but including revenues from the sale of the collected material and other revenues such as subsidies,[27] or other fiscal incentives, where applicable), and, as appropriate in the case of public investors, non-market costs and benefits – if it is standard practice for the selection of public investments in the host country – shall be included.

4) Benchmarks shall be derived from one of the following options:

    a) Government bond rates, increased by a suitable risk premium to reflect private investment and/or the project type, as substantiated by an independent (financial) expert or documented by official publicly available financial data;

    b) Estimates of the cost of financing and required return on capital (e.g., commercial lending rates and guarantees required for the collection activity), based on bankers' views and return required by private equity investors/funds for comparable projects;

    c) A company internal benchmark (the company's weighted average cost of capital), only in the particular case referred to in 2 of Step 3b. The project proponent shall demonstrate that this benchmark has been consistently used in the past, i.e., that project activities under similar conditions developed by the same company used the same benchmark;

[26] For example, investment, operational and maintenance (O&M) costs, capital that needs to be repaid (e.g., loans).
[27] For example, grants that do not need to be repaid, soft loans, contribution to O&M costs or deficit guarantees.

d) Government/official approved benchmark where such benchmarks are used for investment decisions; or

e) Any other indicators, if the project proponents can demonstrate that the above options are not applicable and justification of the indicator is deemed appropriate by the VVB.

5) The investment analysis shall be provided in a transparent manner and shall include all relevant assumptions, preferably in the project description, or in a separate annex to the project description, so that a reader can reproduce the analysis and obtain the same results. The analysis shall refer to all critical techno-economic parameters and assumptions (e.g., capital costs, sale prices of the relevant material type(s), project lifetime) and justify assumptions in a manner that can be validated by the VVB.

6) A clear comparison of the financial indicator for the project activity and the financial benchmark shall be presented in the project description submitted for validation. If the project activity has a less favorable indicator (e.g., lower IRR) than the benchmark, the project activity cannot be considered financially/economically attractive.

   A sensitivity analysis shall be conducted as outlined in Section 7 in the CDM's *Methodological tool 27: Investment analysis* to show whether the conclusion regarding financial attractiveness is robust to reasonable variations in the key assumptions. The investment analysis provides a valid argument in favor of additionality only if it consistently supports (for a realistic range of assumptions) the conclusion that the project activity is unlikely to be financially/economically attractive.

Step 3b outcomes
Outcome 1: If the financial/economic indicator of the project activity is less favorable than the benchmark (e.g., project activity IRR is below the benchmark IRR) in all realistic scenarios of the sensitivity analysis, the project activity is additional.
Outcome 2: If the financial/economic indicator of the project activity is more favorable than the benchmark (e.g., project activity IRR is above the benchmark in at least one of the realistic scenarios included in the sensitivity analysis), the project activity is not additional.

8 QUANTIFICATION OF PLASTIC WASTE COLLECTION

Project proponents shall determine baseline plastic waste collection by using data from prior to the start of the project activity, based on historical collection or parameters from third-party studies. Project proponents shall use publicly available data to determine the additional plastic waste collection resulting from the project activity.

Plastic waste collection, for each material type where feasible, shall be quantified using Equations 2 and 3 provided below.

8.1 Baseline Plastic Waste Collection

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

Baseline plastic waste collection is calculated as follows:

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

(Equation 2)

Where:

$B_{collected,d,y}$ = Total baseline plastic waste collection transferred to destination *d* in year *y* (tonnes), where *d* is an appropriate end destination

$B_{collected,i,d,y}$ = 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 is determined as follows:

1) For a new activity, use the following:

    a) Baseline plastic waste collection equals zero, $B_{collected,d,y}$ = 0

2) For a capacity addition activity, the baseline waste collection shall be determined based on the maximum collection potential of the waste collection system in the three-year period prior to the start of the project activity. If the existing waste collection system is less than three years old, then data from a minimum of one year of operation shall be used to determine baseline collection.

    Waste management data may be obtained from historical records of the waste collection system(s) that existed prior to implementation of the project activity. This data may also be obtained either from existing, publicly audited records or from studies conducted by qualified, independent third parties.

8.2 Project Plastic Waste Collection

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

Project plastic waste collection is calculated as follows:

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

(Equation 3)

Where:

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

$P_{collected,i,d,y}$ = 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).

8.3 Net Plastic Waste Collection

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:

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

(Equation 4)

Where:

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

9 MONITORING

9.1 Data and Parameters Available at Validation

The baseline plastic waste collection parameter shall be recorded in the project description and available at the time of validation. For baseline plastic waste collection, projects that include a new collection activity shall use Table 2a and capacity addition projects shall use Table 2b.

Table 2a: Baseline plastic waste collection parameter (new activity)

Data/Parameter	$B_{collected,d,y}$
Unit	tonnes/year
Description	Amount of plastic waste collected in the baseline and transferred to destination *d* in year *y*
Equation	-
Source of data	-
Justification of choice of data or description of measurement methods and procedures applied	Baseline plastic waste collection is zero for new project activities (see Section 8.1)
Purpose	Determination of plastic waste collection for new activities
Comments	-

Table 2b: Baseline plastic waste collection parameter (capacity addition activity)

Data/Parameter	$B_{collected,d,y}$
Unit	tonnes/year
Description	Amount of plastic waste collected in the baseline and transferred to destination *d* in year *y* for capacity addition activities
Equation	Equation 2
Source of data	Measured or calculated on a dry basis, or external source(s) of data (e.g., primary surveys, third-party literature) (see Section 8.1)
Justification of choice of data or description of measurement methods and procedures applied	Determined based on the maximum collection potential of the waste collection system in the three-year period prior to the start of the project activity. If the existing waste collection system is less than three years old, then data from a minimum of one year of operation shall be used (see Section 8.1)
Purpose	Calculation of baseline plastic waste collection for capacity addition activities
Comments	-

9.2 Data and Parameters Monitored

The following parameters shall be monitored and recorded during the crediting period.

Table 3: Project plastic waste collection

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	Equation 3
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	Direct measurement and recording of weight, cross-checked with the collection site/facility's invoice records and/or receipts of payment, which can be cross-checked by goods receipt notes issued by the end destination. The measurement(s) will be taken at the collection site/facility prior to sending the collected material to the end destination, and/or the measurements will be taken at the appropriate end destination, depending on the contractual agreement between the collection site/facility and the end destination.
Frequency of monitoring/recording	Recorded every time that collected material is sent from the project site/facility to the appropriate end destination
Quality assurance/quality control (QA/QC) procedures applied	Weigh bridges are calibrated according to the equipment manufacturer's specifications or at least every three years
Purpose	Calculation of project plastic waste collection
Comments	-

9.3 Description of Monitoring Plan

The project proponent shall establish and apply quality management procedures to manage data and information. Written procedures (e.g., standard operating procedures, SOPs) shall be established for each measurement task, outlining responsibility, timing and record location requirements. The greater the rigor of the management system for the data, the easier it will be to conduct an audit for the project.

Record keeping practices shall include the following procedures:

- During the crediting period, all parameters listed in Section 9.2 shall be monitored and recorded.
- The project proponent shall establish, maintain and apply a monitoring plan and information system that includes criteria and procedures for obtaining, recording, compiling and analyzing the data, parameters and other information important for quantifying and reporting the amount of collected plastic waste in the project and baseline scenarios.
- Values of logged primary parameters for each measurement interval shall be recorded electronically.
- Written logs of operations and information about the project system, including notation of all shut-downs, start-ups and process adjustments shall be maintained.
- Monitoring equipment shall be maintained and calibrated according to current good practice (e.g., relevant industry standards or manufacturer specifications) or at least every three years.
- Monitoring personnel shall be trained to ensure that monitoring requirements are carried out in accordance with the monitoring plan.
- Monitoring roles and responsibilities shall be clearly defined in the project description, and training requirements addressed.
- All data collected as part of monitoring shall be archived electronically and stored in a secure and retrievable manner for at least two years after the end of the project crediting period.
- QA/QC procedures shall be applied to increase confidence that all measurements and calculations have been made correctly. These include, but are not limited to:
    - Data gathering, input and handling measures;
    - Checking input data for typical errors, including inconsistent physical units and unit conversion errors;
    - Detecting typographical errors caused by data transcription from one document to another, and missing data for specific time periods or physical units;

- Use of version control for all electronic files to ensure consistency;
- Physical protection of monitoring equipment (e.g., sealed meters and data loggers);
- Physical protection of records of monitored data (e.g., hard copy and electronic records);
- Assigning an individual to check data integrity on a regular basis (e.g., manual assessment, comparing redundant metered data, and detection of outstanding data/records);
- Comparing current estimates with previous estimates in order to validate assumptions; and
- Performing recalculations to ensure that no mathematical errors have been made.

APPENDIX I: EXAMPLE PROJECT ACTIVITIES

Table A1: Examples of eligible collection activities

Project proponent	Collection process	End destination	Sector
Municipality/local authority (government, semi-government, quasi-government)	• House to house (door to door) collection • Curb-side and secondary collection points • Through waste pickers from dumpsites, water bodies, and open land • From industrial and commercial establishments	• Landfills • Waste to energy plants (e.g., incineration of municipal solid waste (MSW) with energy recovery, gasification of RDF) • Industries for use as fuel and/or feedstock (e.g., co-processing, pyrolysis, gasification, polymerization, monomerization) • Mechanical recycling • Use in construction materials	Formal
MRF and/or recycling facility			Informal/ Formal
Waste management agency[28]			Informal/ Formal
Volunteer groups/organizations	Voluntary beach/nature clean-ups by: • Groups of individuals, clubs • Community-based organizations (CBOs), NGOs (with or without the help of informal waste-pickers)	• Landfill • For mechanical/chemical recycling	Informal

Table continues on next page

[28] An agency that facilitates collection/recycling of waste through mobilization of waste pickers, aggregators, bailers/sorters, MRFs, recyclers, engagement with regulatory bodies, producer responsibility organizations and all relevant actors in the waste management supply chain as applicable; the agency ensures that the concerned waste management system operates in an environmentally sound and socially just manner.

Project proponent	Collection process	End destination	Sector
Manufacturing facilities[29] such as: (a) Chemical companies using waste plastic as feedstock (b) Cement companies using waste plastic as alternative fuel (c) Construction companies using waste plastic as construction material (d) Energy companies using waste plastic for energy recovery through incineration or gasification	Mobilized by companies/manufacturing facilities through: ● Informal waste pickers ● Producer responsibility organizations, as part of EPR ● Waste management agencies	● Mechanical recycling ● For use as feedstock ● For use as alternative fuel ● For use as construction material ● For energy recovery through incineration or gasification	Informal/ Formal
Producers and brand owners (i.e., entities importing, producing and using packaging materials)			Informal/ Formal

[29] End-user of collected/recycled materials or facility that includes industrial processes that transform the processed materials sent from collection/recycling or a processing facility into finished products.