

# Plastic Waste Recycling Methodology

Version 0.1

7 October 2020

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# 1 SOURCES

The approaches for demonstrating the baseline and additionality have been developed based on the following methodologies:

- CDM tool: [Combined tool to identify the baseline scenario and demonstrate additionality, 2017, version 07.0](#)
- CDM tool: [Tool for the demonstration and assessment of additionality, 2012, version 7.0.0](#)
- CDM tool: [Demonstration of additionality of small-scale project activities, 2019, version 13.0](#)
- CDM tool: [Investment analysis, 2019, version 10.0](#)
- CDM methodology: AMS-III-AJ. [Recovery and recycling of materials from solid wastes, 2018, version 07.0](#)
- CDM methodology: AMS-III-BA. [Recovery and recycling of materials from E-waste, 2018, version 02.0](#)
- EUCertPlast Audit Scheme ([Version 4.0](#))

The following have also informed the development of this methodology:

- [IPCC, Chapter 3, Solid Waste Disposal](#) - 2019 Refinement to the 2006 IPCC Guidelines for Natural Greenhouse Gas Inventories.
- [ISO 14040:2006](#) (E) - Environmental management - Life cycle assessment - Principles and Framework
- [ISO 14064-2:2006](#) (E) (clause 4) - Greenhouse Gases - Part 2: Specification with guidance at the project level for quantification, monitoring and reporting of greenhouse gas emission reductions or removal enhancements
- [ISO 15270:2008](#) (en) - Plastics - Guidelines for the recovery and recycling of plastics waste
- [TE-101-V1.0-2019.10.01](#) - Terms and Definitions for Textile Exchange Standards and Related Documents

## 2 SUMMARY DESCRIPTION OF THE METHODOLOGY

Additionality and Crediting Method	
<b>Additionality</b>	Activity and project method
<b>Crediting Baseline</b>	Project method

1 This methodology provides procedures to estimate the net plastic waste<sup>1</sup> recycled through  
2 mechanical recycling activities, including the installation of new recycling facilities, capacity  
3 additions or technology improvement to existing recycling facilities, recycling of material types  
4 (including packaging) that have not previously been recycled at an existing facility, and  
5 incentivizing or facilitating an increase in the collection of plastic waste.

6 Recycling activities may include sorting and/or processing of plastic waste material (i.e.,  
7 production of recycled material) that otherwise would have been managed in a way that would not  
8 allow for a second life of the material.

9 Projects that include both collection and recycling activities shall apply this methodology in  
10 conjunction with the *Plastic Waste Collection Methodology* to demonstrate additionality and  
11 quantify the plastic waste collected and recycled by the respective activities.

12 Sections that are not applicable to projects using the *Plastic Standard* only to account for the  
13 results of their recycling activities and not to issue Waste Recycling Credits are marked as such<sup>2</sup>.

### 14 3 DEFINITIONS

15 In addition to the definitions set out in the Plastic Waste Reduction Program (Plastic Program)  
16 document *Plastic Program Definitions*, the following definitions apply to this methodology:

- 17 • **Capacity addition:** An investment to increase the capacity of an existing recycling facility  
18 through the addition of new equipment, replacement of existing equipment, modification of  
19 existing equipment and/or modification of the process
- 20 • **Collected material:** Plastics material that has been removed from the environment or  
21 recovered, separated, diverted or removed from the solid-waste stream in order to ensure  
22 suitable end-of-life, such as managed landfill, recycling or incineration with energy recovery  
23 (adapted from [ISO 15270:2008 \(en\) - Plastics - Guidelines for the recovery and recycling of](#)  
24 [plastics waste](#)). This can include post-consumer and post-industrial material.
- 25 • **Collection area:** The geographical area from which plastic waste is collected, including  
26 populated areas (e.g., landfill, waste aggregation center, sorting center) or more dispersed  
27 sources of waste (e.g., households, businesses). In this methodology, where plastic waste  
28 is collected from a landfill, waste aggregation or sorting centers, or other geographical  
29 areas outside the project boundary (i.e., imported plastic waste), the collection area should  
30 include the geographical areas where the waste was originally sourced to determine the  
31 population density in that area.
- 32 • **Contaminant:** Unwanted substance or material. Contaminants may include, but are not  
33 limited to, liquids, organic matter, other plastic types and materials.

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<sup>1</sup> In this document, the term plastic waste refers to all waste that includes materials under the scope of the Plastic Program, including composite materials (e.g., used beverage cartons).

<sup>2</sup> In this *Plastic Waste Recycling Methodology* v0.1, this is Section 7.

- 1 ● **End-products:** The physical goods that result from the product manufacturing process.  
2 Note that final products can be made from virgin (including both fossil and bio-based) or  
3 recycled material, or a combination of both.
- 4 ● **Energy recovery:** The production of useful energy through direct and controlled  
5 combustion ([ISO 15270:2008 \(en\) - Plastics - Guidelines for the recovery and recycling of](#)  
6 [plastics waste](#))
- 7 ● **Input:** Product, material or energy flow that enters a unit process ([ISO 14040:2006 \(E\) -](#)  
8 [Environmental management - Life cycle assessment - Principles and Framework](#))
- 9 ● **Managed landfill:** A waste disposal site for the deposit of waste onto or into land under  
10 controlled or regulated conditions ([ISO 15270:2008 \(en\) - Plastics - Guidelines for the](#)  
11 [recovery and recycling of plastics waste](#)). Waste that is disposed of at the managed landfill  
12 is unlikely to leak into the environment over time. The landfill shall:
- 13 ○ Be government recognized or affiliated;
- 14 ○ Have restrictions on access to avoid waste scavenging;
- 15 ○ Have a well-defined boundary;
- 16 ○ Include at least one of the following: cover material; mechanical compacting, or  
17 leveling of the waste (IPCC, 2019);
- 18 ○ Have daily cover application (with soil or other material) to remove plastic waste  
19 from the influence of the outside environment;
- 20 ○ Have a leachate drainage system (IPCC, 2019) or other reasonable measures to  
21 avoid soil and water contamination;
- 22 ○ Include sanitary lining or other reasonable measures to avoid waste being placed  
23 directly on the ground;
- 24 ○ Be capped when it closes;
- 25 ○ Control placement of waste (i.e., to specific areas in the landfill) (IPCC, 2019); and
- 26 ○ Have measures to avoid fires (i.e., to avoid open burning) (IPCC, 2019).

**Note to Reviewers:** The definition of managed landfill has been developed using established definitions, while being sensitive to the variation in local conditions that affect the quality of accessible landfills, to avoid excluding projects that collect plastic in more remote areas.

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**1. Question for consideration:** Is the definition of managed landfill appropriate? Should projects have to meet all of the above requirements, or are there top requirements that should be included in a subset of priority requirements?

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- **Material concentration:** A stage in the recycling process that occurs after collection and may include one or more of the following activities: sorting, screening, basic contaminant removal and baling. Material is still unprocessed at this stage, meaning it has not been physically or chemically altered beyond basic handling (e.g., screening, crushing, or washing).

**Note to Reviewers:** We included a definition of material concentration because it aligns closely with the intended use of 'sorting' under the Plastic Program, and may help to align existing recycling terminology to the Plastic Program.

- **Open burning of waste<sup>3</sup>:** Uncontrolled waste combustion practices, including dump fires, pit burning, fires on plain 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 such a manner that combustion air 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: Occurs primarily due to its convenience and insufficient collection systems. Domestic open burning is the indiscriminate burning of waste by individuals 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.
  - Deliberate open burning in landfills and open dumpsites: Waste in landfills and open dumpsites is often burned to reduce the quantity when these sites are filled beyond their capacity or have an unknown, and likely insufficient, capacity due to the lack of planning involved in the establishment of open dumps.
  - Spontaneous open burning in landfills and open dumpsites: Fires can occur spontaneously and unintentionally within open dumps and landfills in large piles of trash. These fires are likely caused by the lack of waste treatment, apart from burning, that occurs in these disposal areas.
- **Output:** Product, material or energy flow that leaves a unit process ([ISO 14040:2006 \(E\) - Environmental management - Life cycle assessment - Principles and Framework](#))
- **Process:** Set of interrelated or interacting activities that transform inputs into outputs ([ISO 14040:2006 \(E\) - Environmental management - Life cycle assessment - Principles and Framework](#))

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<sup>3</sup> R20 - Regions of Climate Action (2019). *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](https://regions20.org/wp-content/uploads/2016/08/OPEN-BURNING-OF-WASTE-A-GLOBAL-HEALTH-DISASTER_R20-Research-Paper_Final_29.05.2017.pdf)

- 1 • **Recyclable<sup>4</sup>:** For something to be deemed recyclable, the system must be in place for it to be  
2 collected, sorted, reprocessed and manufactured back into a new product or packaging — at  
3 scale and economically. Recyclable here refers to mechanically recyclable.
- 4 • **Recycled material:** Material that has been reprocessed from collected material by means  
5 of a manufacturing process and made into a final product or into a component (e.g., pellets)  
6 for incorporation into a product ([TE-101-V1.0-2019.10.01 - Terms and Definitions for Textile](#)  
7 [Exchange Standards and Related Documents](#))
- 8 • **Recycling facility:** A facility where the recycling process takes place. This can include  
9 waste sorting facilities that prepare plastic waste for recycling.
- 10 • **Region:** The spatial boundary covering at least the geographical area containing the raw  
11 material sources and the product markets for the project proponent, and at most the  
12 maximum region surrounding the project facility having similar technological, economic,  
13 environmental and regulatory circumstances. By default, the region is the entire host  
14 country (generally applicable for smaller countries). If the project proponent limits the  
15 applicable geographical area to a specific geographical area (e.g., province, state) within  
16 the host country (generally applicable for larger countries), then it shall provide justification  
17 on the essential distinction between the identified specific geographical area and rest of the  
18 host country, based on the aforesaid criteria.
- 19 • **Unmanaged landfill:** A waste disposal site that does not comply with the definition of  
20 'managed landfill'

## 21 4 APPLICABILITY CONDITIONS

### 22 4.1 This methodology is applicable under the following conditions:

- 23 4.1.1 Project activities that result in recycled plastic waste through mechanical recycling may  
24 include any of the following, or combinations of the following:
- 25 1) Installation of a new recycling facility;
  - 26 2) Capacity addition or technology improvement to an existing recycling facility;
  - 27 3) Processing material types that have not previously been recycled at the existing  
28 facility; and
  - 29 4) Incentivizing and/or facilitating an increase in the collection of plastic waste (e.g.,  
30 paying price premiums to collectors, establishing collection points at landfills).

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<sup>4</sup> PEW & SYSTEMIQ (2020). Breaking the Plastic Wave. Available at: [https://www.pewtrusts.org/-/media/assets/2020/07/breakingtheplasticwave\\_report.pdf](https://www.pewtrusts.org/-/media/assets/2020/07/breakingtheplasticwave_report.pdf)

**2. Question for consideration:** Recycling activities that include incentivizing or facilitating an increase in the collection of plastic waste will likely rely on the actions of collection and/or sorting entities outside the recycling facility. How best can the Plastic Program incentivize the flow of finance to the relevant entities outside the recycling facility?

1

**Note to Reviewers:** Chemical recycling is not currently included in this methodology because a more detailed assessment is required to develop appropriate guidance for chemical recycling activities. A new methodology may be made for chemical recycling, or this methodology may be expanded to include chemical recycling after the launch of the Plastic Program in January 2021.

2

3 4.1.2 The recycling activity may include material concentration of plastic waste, processing of  
4 plastic waste into recycled material (e.g., pellets) and/or manufacturing of plastic waste  
5 into end-products.

6 4.1.3 The plastic waste being recycled is either collected or diverted from:

7 1) The environment or an unmanaged landfill;

8 2) A managed landfill;

9 3) Open burning;

10 4) Incineration with energy recovery (co-processing, gasification, pyrolysis);

11 5) Incineration without energy recovery; or

12 6) Any other waste management option that does not allow for a second life of the  
13 plastic material.

14 4.1.4 It is possible to directly measure and record the final output of the recycling facility (i.e., the  
15 weight of materials leaving the recycling facility on a dry basis) segregated by material  
16 type.

17 4.1.5 Credible evidence such as contractual agreements, receipts of sale of recycled material or  
18 third party survey results shall be provided to show that the materials supplied from the  
19 mechanical recycling facility will be used for processing or manufacturing of plastic  
20 products, thereby replacing the use of virgin plastic material.

21 Exceptions are made for projects that recycle composite materials that contain plastic,  
22 where the following can be demonstrated:

23 1) Plastic cannot be separated out from the composite material and recycled  
24 independently (e.g., lack of accessible technology to separate the layers of the  
25 composite material to independently recycle the plastic component); and

26 2) The project implements a suitable application for the recycled plastic waste that will  
27 degrade as little as possible and allow the material to be further recycled. This can

1 include demonstration of an existing supply chain for further recycling of the end-  
2 product containing the recycled plastic waste.

3 In all cases, credible evidence shall be provided to show that the waste materials are not  
4 used as a source of fuel and do not present a high risk of leaking into the environment at  
5 any stage in the recycling process. This includes leakage during or immediately after the  
6 intended use of the end-product.

## 7 **4.2 This methodology is not applicable under the following conditions:**

8 4.2.1 The project processes plastic waste that has been collected in and imported from other  
9 countries, except in the following circumstance:

- 10 1) The project processes waste (using sustainable waste management practices)  
11 imported from a Least Developed Country (LDC)<sup>5</sup> or Small Island Developing State  
12 (SIDS)<sup>6</sup>, where there is a robust and transparent audit trail ensuring the end  
13 destination can be demonstrated.
- 14 2) Projects involving import of plastic waste from other countries for further processing  
15 where the appropriate quality and quantity of the material type is not available in the  
16 importing country. Project proponents shall demonstrate the same through primary  
17 surveys or secondary literature available in the public domain and/or certified by a  
18 competent authority<sup>7</sup>.

**Note to Reviewers:** The objective of this applicability condition is to discourage the export of waste from developed and developing nations (except LDCs and SIDS) and to encourage development of local waste management infrastructure and practices.

19

### **3. Questions for Consideration:**

- a) Is this approach of excluding transboundary movement of plastic waste, unless it entails the collection of plastic waste in LDCs or SIDS and export to other countries (LDC, SIDS or otherwise) for further processing, appropriate?
- b) Should the import of materials be limited to semi-processed waste when the material type is not available in the importing country?

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<sup>5</sup> 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>

<sup>6</sup> United Nations (n.d.). List of SIDS. Available at: <https://www.un.org/ohrls/content/list-sids>

<sup>7</sup> A competent authority denotes an entity that has been authorized by the concerned regulatory body or overseeing local or national government body/department/ministry or an internationally recognized organization to execute and/or certify the task in question. The same is subject to verification by the project auditor.

1 4.2.2 Projects or facilities that include chemical recycling and/or energy recovery (e.g., thermal  
2 and/or electric energy generation). This methodology is intended for recycling facilities that  
3 operate mechanical recycling only.

**Note to Reviewers:** Our rationale is that there may be challenges to ensure that recycling facilities that include both mechanical and chemical recycling (and/or energy recovery) do not use the income from plastic credits (from mechanical recycling activities) for chemical recycling (and/or energy recovery). For example, the sorting process could be used by more than one activity, so it is not easy to distinguish the financial investment at the additionality level.

Allowing recycling facilities with only mechanical recycling will reduce the burden of demonstration on the project and the cost of auditing to check the flow of credit finance.

4  
5 4.2.3 Projects that use waste plastic material for applications that have a high risk of leaking into  
6 the environment during any stage of the recycling process, including during and after the  
7 intended use of the end-product, or are harder to mechanically recycle as a result of their  
8 application. This includes the use of plastic waste material for the purpose of road  
9 construction as this does not allow for a second life of the recycled plastic material and the  
10 other materials used.

**4. Questions for Consideration:**

- a) Is the exclusion above sufficient to avoid recycled materials being used in applications that have a high risk of leakage into the environment?
- b) Are there any other materials or applications that should be explicitly excluded or additional risks that should be addressed in this methodology?
- c) Should the methodology include guidance on how to determine whether the material application represents a 'high-risk' of leaking into the environment?

## 11 5 PROJECT BOUNDARY

12 The spatial extent of the project boundary encompasses:

- 13 • The facility where plastic materials are mechanically recycled; up to the stage where  
14 recycled materials are produced; and
- 15 • The sorting facility, if separate from the recycling facility

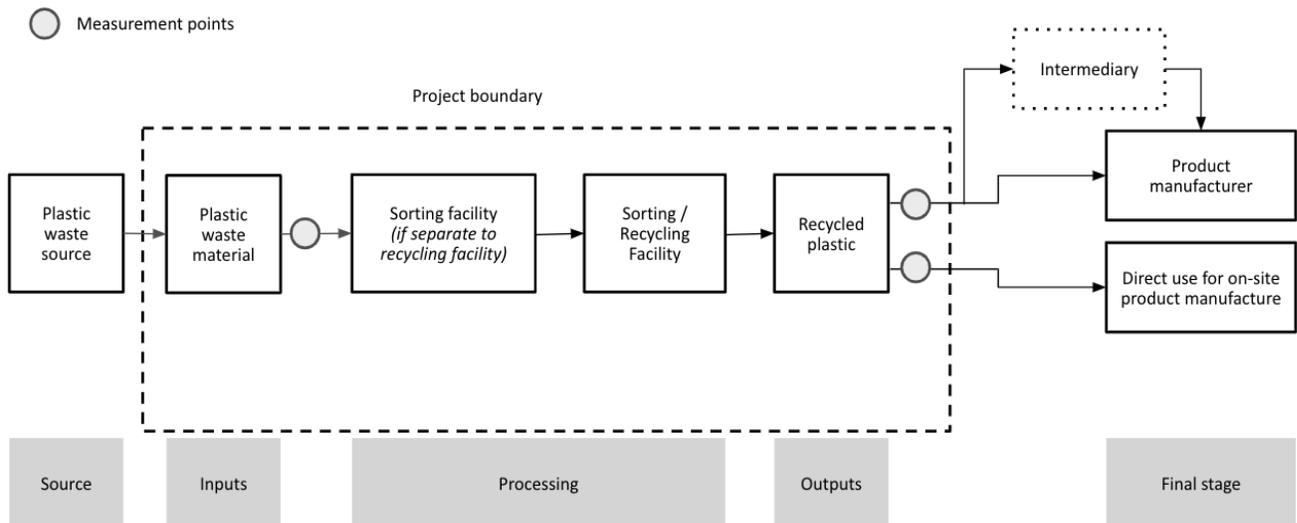
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1 **Figure 1: Spatial boundary of the project activity**



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## 3 6 BASELINE SCENARIO

4 The baseline scenario is that plastic waste would remain in the environment or other waste  
5 streams without the plastic waste recycling activity. The methodology uses a project method to  
6 determine the crediting baseline as outlined in Section 8.1.

## 7 7 DEMONSTRATION OF ADDITIONALITY

8 Project activities shall apply the stepwise approach to demonstrate additionality as shown in  
9 Figure 2 and in accordance with the guidance in this section.

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

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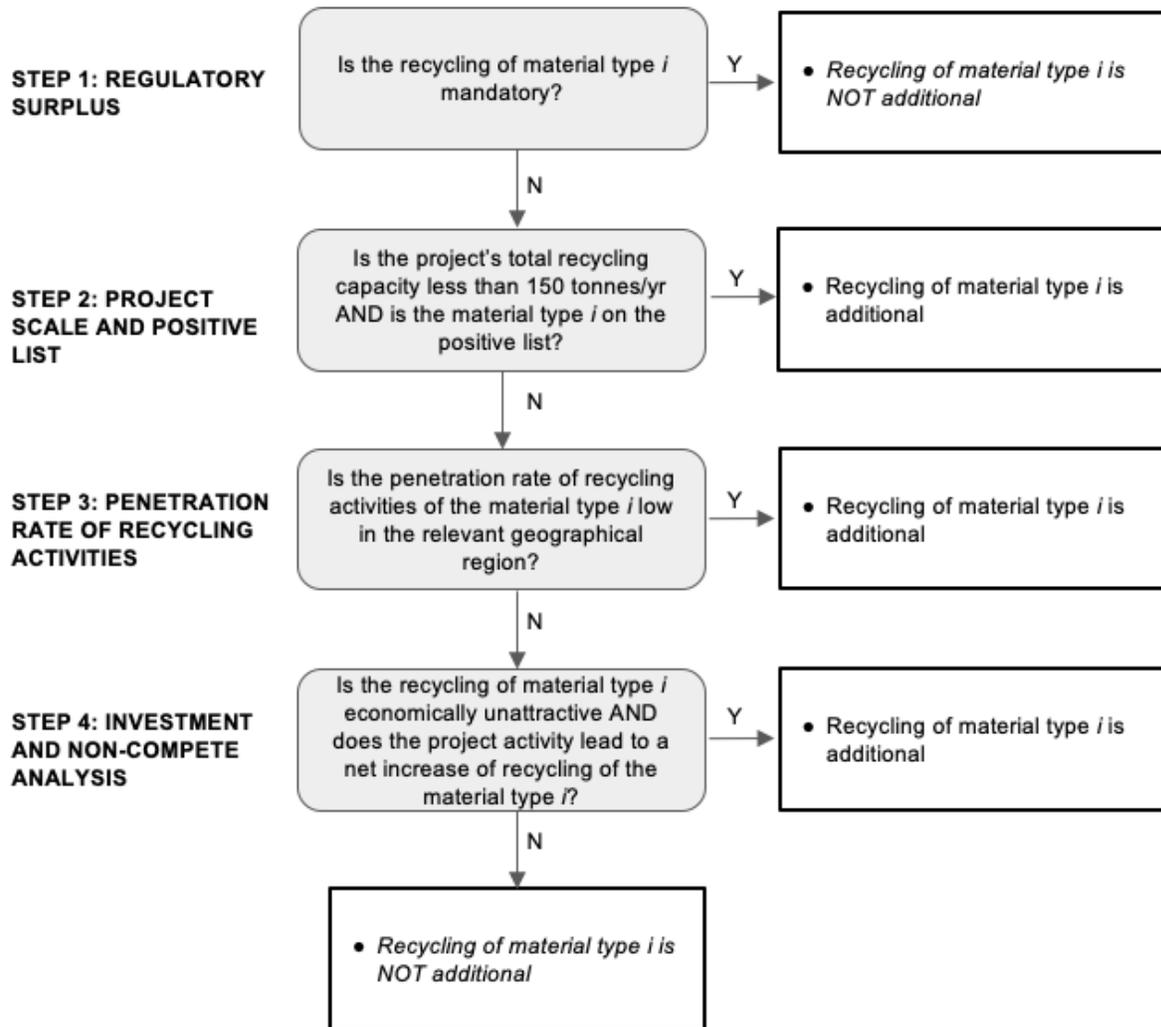
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1 Figure 2: Decision-tree for demonstrating additionality



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3 **7.1 Step 1: Regulatory Surplus**

4 The project proponent shall demonstrate that the project activity proactively exceeds the current  
 5 regulations or the regulatory compliance scenario and initiates a new recycling activity, or expands  
 6 an existing one, without being registered as a project activity under the Plastic Program. The  
 7 project proponent shall determine whether the applicable laws and regulations are enforced and  
 8 determine the compliance rate for those that are. The project proponent may demonstrate  
 9 widespread non-compliance in the project region by showing that the existing compliance rate is  
 10 less than 50 percent, and thus the project activity meets the regulatory surplus requirement.

11 Compliance with a law or regulation in a given region shall be measured by the total number of  
 12 relevant entities in the region complying with the law or regulation divided by the total number of

1 relevant entities in the region to whom the law or regulation applies. For example, if two out of 20  
2 mechanical recycling facilities in a state are in compliance with an applicable plastic waste  
3 recycling regulation, then the compliance rate is 10 percent. The compliance rate may be  
4 determined based on primary surveys or from secondary literature published and/or certified by a  
5 competent authority.

6 The assessment shall include a list of all extended producer responsibility (EPR) and related  
7 voluntary schemes relevant to the project activity and material type(s) in the applicable region. The  
8 existence of relevant EPR and related voluntary schemes shall not be used to indicate an existing  
9 legal requirement for the project activity unless the specific EPR scheme is required by law.

#### Outcome Step 1:

Outcome 1: There are no laws or regulations that enforce recycling of the relevant material type(s) in the relevant country or region. Proceed to Step 2.

Outcome 2: There are legal and/or regulatory requirements for recycling of the relevant material type(s) but they are not systematically enforced and noncompliance is widespread. Proceed to Step 2.

Outcome 3: Recycling of some or all of the relevant material type(s) is enforced by law or regulation. Recycling of these relevant material type(s) is not additional.

10

**5. Question for Consideration:** We note that there are many EPR schemes emerging globally around plastic consumption, collection and recycling. Should EPR schemes be included as part of the regulatory surplus assessment? If so, is the guidance provided sufficient to avoid confusion of how EPR schemes should be treated when undertaking the regulatory surplus assessment?

## 11 **7.2 Step 2: Project Scale and Positive List**

### 12 **Step 2a: Determination of project scale**

13 Determine the total installed capacity of the recycling facility, including all relevant material types  
14 that will be recycled under ideal conditions given by the manufacturer's equipment specifications.  
15 If the recycling capacity depends on the mix of different material types, the highest possible  
16 capacity shall be used as a conservative approach.

## Outcome Step 2a:

Outcome 1: If the total installed capacity is less than or equal to 150 tonnes per year, proceed to Step 2b.

Outcome 2: If the total installed capacity is greater than 150 tonnes per year, proceed to Step 3.

1

**Note to Reviewers:** The proposed threshold was determined based on a rapid financial assessment to identify the lowest capacity (tonnes of plastic per year) at which a project can operate and recover the costs of project certification through Plastic Credits and at the same time also generate some revenues for the project proponent. This financial assessment considered the following costs and assumptions:

- The costs of project development for project registration and credit issuance (i.e., preparation of project documents for registration and issuance) under the Plastic Program.
- Registration and issuance fees under the Plastic Program (Note: The *Plastic Program Fee Schedule* is under review and will be published in January 2021. In the interim we have used the *VCS Program Fee Schedule* as recommended by Verra).
- Third-party audit fees for validation and verification of the project.
- A project operating under this threshold does not generate enough revenues to account for all transaction costs involved for the project proponent. Therefore, efforts should be made to reduce the cost burden on small-scale projects.
- Project development costs are assumed to be 33% lower for projects under the 150 tonne per year threshold assuming simplified modalities and procedures for small-scale projects.

2

**6. Question for Consideration:** The intent of this threshold is to reduce the burden of demonstrating additionality on small-scale projects that are likely to face higher financial burdens than larger-scale projects who would be required to undertake in-depth financial assessment. Does a threshold of 150 tonnes per year to distinguish between projects that may have a streamlined process to demonstrate additionality seem reasonable?

### 3 **Step 2b: Identify material types that are on the positive list for facilities with a total** 4 **installed capacity less than or equal to 150 tonnes/yr**

5 The project proponent may skip Step 2b and directly proceed to Step 3 or Step 4, if the relevant  
6 material type does not appear on the positive list.

7 For facilities with a total installed capacity that is less than or equal to 150 tonnes per year, the  
8 material type(s) recycled by the project shall be assessed using Table 1 based on the country's

1 income level (HI: high income; UMI: upper and middle income; LMI: lower and middle income; LI:  
 2 low income<sup>8</sup>) and population density or cleanup, where the project is based.

3 The material types shall be defined within one of the following categories:

- 4 1) Rigid PET and HDPE (e.g., water bottles, cleaning product bottles, milk bottles, shampoo
- 5 bottles, trays, reusable shipping containers, buckets, jars);
- 6 2) Rigid mono-material (except PET and HDPE) (e.g., plastic bottles, pots, canisters, cups,
- 7 containers, trays, food service disposables, B2B packaging, household goods);
- 8 3) Flexible mono-material (e.g., films, carrier bags, pouches, pallet shrouds, B2B films); or
- 9 4) Composite materials (both rigid and flexible) (e.g., sachets, foils, envelopes, diapers, liquid
- 10 board packaging such as used beverage cartons)

11 **Table 1: Positive list based on material type, population density or cleanup, and income level**

	<b>Urban</b> population density of >400 inhabitants/km <sup>2</sup> in the collection area of the project activity	<b>Rural</b> population density of <400 inhabitants/km <sup>2</sup> in the collection area of the project activity	<b>Cleanup</b> plastic is being cleaned up after it has leaked into the environment
<b>HI</b>	-	-	all material categories
<b>UMI</b>	-	all material categories except rigid PET and HDPE	all material categories
<b>LMI</b>	all material categories except rigid PET and HDPE	all material categories	all material categories
<b>LI</b>	all material categories	all material categories	all material categories

12

**Note to Reviewers:** It is very difficult to get accurate data on which this table can be based. We tried to come up with a conservative approach which should allow projects in low-income and lower middle income countries to use a simple demonstration of additionality. The table will undergo expert review. In particular, we are looking for project examples that would be deemed additional according to the matrix but should not be deemed as additional in practice.

<sup>8</sup> World Bank (2019). *Classifying Countries by Income*. Available at: <http://datatopics.worldbank.org/world-development-indicators/stories/the-classification-of-countries-by-income.html>

The selected population density values in the table are aligned with the urban/rural definition of most countries. We note that there may be cases where a project is sourcing plastic from a low population density area that is near a densely populated area. However, we anticipate that such cases will be uncommon and that the cost of collection from areas with low population density would still be high.

The categories proposed for material type in the positive list are based on the PEW report [Breaking the Plastic Wave](#) (2020), the Greenpace [Circular Claims Fall Flat](#) report (2020) and the [Ellen MacArthur Foundation New Plastics Economy Report](#) (2017). These categories have been chosen because they have a relatively higher likelihood of being recycled than other material types. This categorization is less burdensome than alternative categorizations such as by market value, and takes into consideration the fact that even most types of rigid mono-material plastics are currently not widely recycled.

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### 7. Questions for Consideration:

- a) Are the proposals in the positive list reasonable?
- b) Are the proposed plastic waste categories in the positive list table appropriate? Can this information be easily obtained by a project?
- c) Do you have suggestions of data sources that we should use to determine/validate the categories in the positive list?

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### Outcome Step 2b

**Outcome 1:** The material type is listed in the positive list under the project's income and population density circumstances. In this case the recycling of this material type is additional.

**Outcome 2:** The material type is not listed in the positive list under the project's income and population density circumstances. Proceed to either Step 3 (penetration rate) or Step 4 (investment analysis) based on relevance for the project.

### 3 7.3 Step 3: Penetration Rate of Recycling Activities

4 The project proponent may skip Step 3 and proceed directly to Step 4 if Step 3 is not relevant for  
5 the project.

6 The project proponent shall assess the penetration rate of the project activity in the relevant  
7 geographical region. The penetration rate (percent) is given as the ratio between the total installed  
8 recycling capacity in the geographical region (tonnes/yr) and the plastic waste production  
9 (tonnes/yr). If this penetration rate is below 10 percent, the project activity including all material  
10 types recycled is additional.

1 Any data or studies used in this Step 3 to determine either value shall be no more than three years  
2 old for activities with a total installed capacity less than or equal to 150 tonnes/yr or one year for  
3 activities with a total installed capacity greater than 150 tonnes/yr prior to the time of the  
4 validation.

5  
6 7.3.1 The relevant geographical region that the values are being determined for shall be the  
7 same as the collection area of the project activity.

8 7.3.2 The total plastic waste generation,  $P$  (tonnes/yr), in the geographical region shall be  
9 determined by one of the following options:

- 10 1) Publicly available information (e.g., government data, local authorities, third-party  
11 studies); or  
12 2) Based on population size in the geographical region and plastic waste generation rates  
13 (kg/yr per capita). Where there is no publicly available data on plastic waste generation  
14 rates, default values included in Table 2 may be applied.

15 **Table 2: Default values for plastic waste generation rates (kg/yr per capita)<sup>9</sup>**

	Urban	Rural
HI	76	76
UMI	31	21
LMI	21	11
LI	18	9

16

**8. Question for Consideration:** Our approach is based on penetration rate for all material types. We used the recently published report Breaking the Plastic Wave (PEW & Systemiq (2020), [Evaluating scenarios toward zero plastic pollution](#)) to determine the default values for recycling. Although we acknowledge that waste generation and recycling rates may differ between material types, there is a lack of publicly available data to make informed calculations per material type. Is the source provided above suitable evidence for the default values? Are there other data sources that you think we should use to determine these values?

17 Where significant plastic waste stocks from other sources (e.g., landfills) are available  
18 for recycling, these amounts can be included in  $P$  proportional to the first crediting  
19 period of the project (i.e., by dividing the total recoverable amount in the crediting

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<sup>9</sup> PEW & Systemiq (2020). *Evaluating Scenarios Towards Zero Plastic Pollution*. Available at: <https://science.sciencemag.org/content/sci/suppl/2020/07/22/science.aba9475.DC1/aba9475-Lau-SM.pdf>

- 1 period by the number of years of the first crediting period). Evidence such as  
2 inventories from the landfill operator or third-party studies shall be provided and  
3 conservative assumptions shall be made.
- 4 7.3.3 Determine the total installed recycling capacity,  $C$  (tonnes/yr), of all legally recognized  
5 recycling facilities in the geographical region based on data from local authorities or  
6 independent market research, excluding other plastic recycling project activities  
7 undergoing validation or that are already registered under the Plastic Program. In case  
8 such data is not available, the project proponent shall demonstrate in a credible way how  
9 this capacity is determined.
- 10 7.3.4 Only plastic wastes that can be realistically collected and recycled shall be accounted for.  
11 Where a project activity includes a specific material type for which reliable publicly  
12 available information indicates that the penetration rate for the material type is higher than  
13 the overall penetration rate, the calculation shall focus on this material type only.
- 14 7.3.5 Determine the penetration rate,  $PR$  (percent), as the ratio between the total installed  
15 recycling capacity and the total plastic waste generation:  $PR = \frac{C}{P}$

### Outcome Step 3:

Outcome 1: If the project activity has a  $PR \leq 10\%$  the project activity is additional.

Outcome 2: For any other outcome proceed to Step 4.

## 16 7.4 Step 4: Investment and Non-Compete Analysis

17 The objective of this step is to demonstrate that the project activity is not economically or  
18 financially attractive without the revenue from the sale of Plastic Credits (Step 4a). Further, it shall  
19 be demonstrated that the project activity does not compete with other existing recycling activities  
20 and that it leads to a net increase of recycled plastic waste in the region.

21 Step 4 only needs to be applied if the project's additionality has not been demonstrated in Step 2  
22 or Step 3.

### 23 Step 4a: Investment Analysis

24 Please note that the latest approved version of the "Methodological tool: Investment analysis",  
25 available on the UNFCCC website, shall be used when applying this step.

26 The project proponent can choose between a unit price comparison analysis (Option 1) and a  
27 benchmark analysis (Option 2). For projects recycling composite materials, the project proponent  
28 can only use a benchmark analysis (Option 2) for the recycling of the composite materials.

1 **Option 1: Apply unit price comparison analysis**

2 Determine the unit price of the recycled plastic per material type in the project activity. The unit  
3 price shall be the levelized cost of recycling per material type (\$/kg) plus 10 percent. The market  
4 price of virgin plastic for each type in the country or relevant region shall be determined by one of  
5 the following:

- 6 1) Publicly available information;
- 7 2) Independent market research; or
- 8 3) The lowest value of three different providers of virgin plastic in the country or relevant  
9 region.

10 To account for market volatility in oil prices, the average price of virgin plastic material over the  
11 three-year period immediately prior to the time of decision making of the project activity shall be  
12 used to determine the levelized cost of recycling.

**9. Question for Consideration:** Is the levelized cost of recycling per material type the appropriate unit price? Is it reasonable to compare the unit price against the price of virgin plastic for the same material type?

13

**Outcome Step 4a - Option 1:**

Outcome 1: If the unit price of the recycled plastic for a given material type is above the market price of virgin plastic, the project activity is additional. Proceed to Step 4b.

Outcome 2: If the unit price of the recycled plastic for a given material type is below the market price of virgin plastic, the project activity is not additional.

14 **Option 2: Apply benchmark analysis**

15 The benchmark analysis is based on the CDM tool “Tool for the demonstration and assessment of  
16 additionality” with minor adjustments, as given in the following:

17 7.4.1 The IRR of the project activity shall be used as the financial indicator.

18 7.4.2 The financial analysis shall be based on parameters that are standard in the market and  
19 not linked to the subjective profitability expectation or risk profile of a particular project  
20 proponent.

21 7.4.3 All relevant costs (e.g., investment, operational and maintenance costs) and revenues  
22 (excluding revenues from plastic credits, but possibly including, for example, subsidies or  
23 other fiscal incentives, where applicable) shall be included.

24 7.4.4 Benchmarks shall be derived from one of the following options:

- 1) 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;
- 2) Estimates of the cost of financing and required return on capital (e.g., commercial lending rates and guarantees required for the recycling activity), based on bankers views and private equity investors/funds' required return on comparable projects;
- 3) Government/official approved benchmark where such benchmarks are used for investment decisions; or
- 4) Any other indicators, if the project participants can demonstrate that the above options are not applicable and their indicator is appropriately justified.

7.4.5 The investment analysis shall be provided in a transparent manner and 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, sales prices of the relevant material type(s), lifetimes) and justify and/or cite assumptions in a manner that can be validated by the auditing body.

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

7.4.7 Where project activities include recycling of both PET and other plastic materials, the IRR of the following two scenarios shall be determined and assessed under the benchmark analysis:

- 1) Scenario 1: Recycling of all plastic wastes as under the proposed project activity:  
The IRR of the proposed project activity shall be determined, including both PET and the other material types that will be recycled.
- 2) Scenario 2: Recycling of PET only (alternative scenario)  
An alternative scenario to the project activity shall be established to assess if recycling of PET is financially attractive. This alternative scenario consists of the recycling of PET only, without including any other materials. The following guidance shall be followed to establish this scenario and determine its IRR:
  - a) The amount of PET that would be recycled under this alternative scenario shall be reasonably established by taking into account PET availability in the region, financial capacity of the project proponent and market demand for recycled PET, among other relevant factors. For simplicity, it may be assumed that the amount of PET recycled under this alternative scenario would be equal to the amount of PET recycled by the project activity. The

1 investment costs, costs for acquisition of plastic waste (e.g., purchase costs  
2 or costs for collection), general O&M costs and any other relevant costs  
3 (e.g., insurance policies, sales costs) shall be determined for this alternative  
4 scenario based on the amount of PET established under Scenario 1.

5 b) The revenues from recycled PET shall be estimated in accordance with the  
6 amount of PET recycled as per Scenario 1.

7 Further, it is mandatory to apply the most recent version of the [CDM tool "Investment analysis"](#)<sup>10</sup>  
8 for the investment analysis in conjunction with the guidance above.

9  
10 A sensitivity analysis shall be included that shows whether the conclusion regarding the financial  
11 attractiveness is robust to reasonable variations in the critical assumptions. The investment  
12 analysis provides a valid argument in favor of additionality only if it consistently supports (for a  
13 realistic range of assumptions) the conclusion that the project activity is unlikely to be financially  
14 attractive.

15  
**10. Question for Consideration:** Are the two options provided for the investment analysis appropriate?

16

#### **Outcome Step 4a - Option 2:**

Outcome 1: If the IRR of Scenario 1 (i.e., project activity) AND the IRR of Scenario 2 (i.e., PET only) are below the benchmark in all realistic scenarios of the sensitivity analysis, the project activity is additional. Proceed to Step 4b.

Outcome 2: If the IRR of Scenario 1 is below the benchmark in all realistic scenarios of the sensitivity analysis and the IRR of Scenario 2 is above the benchmark in at least one of the realistic scenarios of the sensitivity analysis, the recycling of PET in the project activity is not additional, and the recycling of other material types is additional. In this case, crediting will only be possible for the material types other than PET in the project activity. Proceed to Step 4b.

Outcome 3: If the IRR of the project activity is above the benchmark in at least one of the realistic scenarios included in the sensitivity analysis of Scenario 1, the project activity is not additional.

#### **Step 4b: Non-Compete Analysis**

17  
18 7.4.8 The project proponents shall demonstrate that the project activity does not compete with  
19 other recycling activities and leads to a net increase of the recycling rate of the material

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<sup>10</sup> CDM (n.d.). Investment Analysis. Available at: [https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-27-v1.pdf/history\\_view](https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-27-v1.pdf/history_view)

1 types that were determined to be additional under Step 4a in the applicable geographical  
2 region (as defined in Step 3), including the following proofs at a minimum:

- 3 1) **Proof 1:** Project activity does not divert plastic waste from any historically existing  
4 legally recognized recycling activity, deliberately create plastic waste for the  
5 purpose of recycling, or switch an existing source of plastic waste to an area within  
6 the project boundary, even if this plastic waste was not previously recycled, without  
7 an increase in capacity; and
- 8 2) **Proof 2:** The total installed recycling capacity in the relevant geographical region,  
9 including (i) other project activities undergoing validation and that have already  
10 been registered under the Plastic Program; and (ii) the recycling capacity of the  
11 project activity, shall not exceed 100% of the total plastic waste available (as  
12 determined in Step 3).

#### Outcome Step 4b:

Outcome 1: If the project does not lead to any diversion of plastic waste recycling (Proof 1) and does not exceed 100% of the total plastic waste available (Proof 2), the project activity is additional.

Outcome 2: For any other cases, the project activity is not additional.

13

**11. Question for Consideration:** Is the approach to overcome data deficiencies by allowing assessments based on different categorizations within the decision-tree reasonable? For example:

- Step 1 requires assessment based on the entire project activity
- Step 2 requires assessment based on total project recycling capacity and specific material categorization (e.g., material type, waste valuation, material application)
- Step 3 requires assessment based on total regional recycling capacity and total waste generation in the relevant geographical region
- Step 4 requires assessment based on plastic type OR total project recycling activity

14

## 15 8 QUANTIFICATION OF PLASTIC WASTE RECYCLING

16 Projects shall use the equations below to calculate the amount of plastic waste recycled at  
17 baseline and the amount of plastic waste recycled by the project activity that would not have been  
18 recycled otherwise. Projects that increase the total installed material recycling capacity are  
19 considered as capacity additions.

1 **8.1 Baseline Recycling**

2 Baseline recycled plastic waste is the amount of plastic waste that would have been recycled in  
3 the absence of the project activity, determined as follows:

$$BP_{recyc,y} = \sum_i P_{recyc,i,y} \times \%SB_{recyc,i} \quad \text{(Equation 1)}$$

4 Where:

5  $BP_{recyc,y}$  = Baseline recycled plastic waste in year  $y$  (tonnes)

6  $P_{recyc,i,y}$  = Amount of material type  $i$  recycled by the project activity in year  $y$  (tonnes)

7  $\%SB_{recyc,i}$  = Share of baseline recycled plastic by material type  $i$  (%). This is the  
8 percentage of plastic waste recycled by the project activity that would also have been  
9 recycled in the baseline scenario in year  $y$ .

10 The amount of material type  $i$  recycled by the project activity in year  $y$  is determined as  
11 follows:

$$P_{recyc,i,y} = (P_{out,i,y} + P_{prod,i,y}) \times AFC_i \quad \text{(Equation 2)}$$

12 Where:

13  $P_{out,i,y}$  = Amount of recycled material type  $i$  leaving the facility in year  $y$  (tonnes)

14  $P_{prod,i,y}$  = Amount of recycled material type  $i$  used for onsite manufacturing of  
15 products in year  $y$  within the recycling facility (tonnes)

16  $AFC_i$  = Adjustment factor for composite material  $i$  (%). For non-composite  
17 materials, this factor is equal to 1.

18 **8.1.1 Adjustment factor for composite materials**

19 Project activities that recycle composite materials may only issue Plastic Credits on the  
20 portion of plastic within the composite material. The amount of plastic waste recycled shall  
21 be determined by one of the following options:

22 1) **Option A:** Apply the default factors listed in Table 3 that correspond to the  
23 composite materials recycled.

1 **Table 3: Default values for plastic waste fraction of composite materials**

Composite application	Plastic fraction (%)
Composite material (unspecified)	4
Used beverage cartons	20 <sup>11</sup>
Paper cups (with Polyethylene)	5 <sup>12</sup>
E-waste	4 <sup>13</sup>

2 2) **Option B:** Sampling shall be applied to determine the fraction of plastics in the  
3 composite material following the most recent version of the CDM methodology  
4 “Sampling and surveys for CDM project activities and programmes of activities”<sup>14</sup> in  
5 conjunction with the guidance below:

6 a) Projects shall use 90/10 confidence/precision to establish the reliability of  
7 sampling efforts and undertake sampling of composite materials at least  
8 every 6 months.

9 b) The sampling method shall be detailed in the monitoring plan.

10 **Note to Reviewers:** It is challenging to find reliable data sources of the plastic component within composite materials. The default factors provided above are based on publicly available data. Where a range of plastic fractions were found, the lowest fraction (percent) was used to identify conservative default factors for each composite material application.

11 **12. Questions for Consideration:**

- a) Is the proposed method for quantification of the amount of plastic in composite materials reasonable?
- b) Are the proposed default factors to determine the portion of plastic in composite materials appropriate?
- c) Are there other types of composite materials that should be included in Table 3?
- d) Do you have any suggestions of data sources that could be used to determine and/or support the default factors in Table 3?

<sup>11</sup> A conservative default factor was identified using material composition of Tetra Pak beverage cartons from 2018 and 2020 sustainability reports. Available at: <https://assets.tetrapak.com/static/documents/sustainability/tetra-pak-sustainability-report-2018.pdf> and <https://assets.tetrapak.com/static/documents/sustainability/sustainability-report2020.pdf>

<sup>12</sup> European Commission (2018). *Life Cycle Inventories of Single Use Plastic Products and their Alternatives*. Available at: [https://ec.europa.eu/environment/enveco/circular\\_economy/pdf/studies/DG%20ENV%20Single%20Use%20Plastics%20LCA%20181213.pdf](https://ec.europa.eu/environment/enveco/circular_economy/pdf/studies/DG%20ENV%20Single%20Use%20Plastics%20LCA%20181213.pdf)

<sup>13</sup> Allassali et al (2019). *Classification of plastic waste originated from waste electric and electronic equipment based on the concentration of antimony*. *Journal of Hazardous Materials*, volume 380. Available at: <https://doi.org/10.1016/j.jhazmat.2019.120874>

<sup>14</sup> CDM Methodology (n.d.). *Sampling and surveys for CDM project activities and programmes of activities*. Available at: <https://cdm.unfccc.int/Reference/Standards/index.html>

1

## 2 8.1.2 Share of baseline recycled plastic waste

3 The share of baseline recycled plastic waste  $\%SB_{recyc,i}$  is given as follows:

4 1. New projects:  $SB_{recyc,i} = 0\%$

5 2. Capacity addition:

$$SB_{recyc,i} = \frac{P_{BL,i,y}}{P_{BL,i,y} + P_{recyc,i,y}} \quad \text{(Equation 3)}$$

6 Where:

7  $P_{BL,i,y}$  = Amount of material type  $i$  recycled in the baseline in the year  $y$  (tonnes)

8

9 For capacity additions, the amount of material type  $i$  recycled in the baseline in year  $y$  is  
10 determined by one of the following options:

11 1) Average annual recycling rate of material type  $i$  over a three-year period prior to the  
12 start of the project activity or average annual recycling rate of material type  $i$  since  
13 the operational start date of the existing facility until the start of the project activity,  
14 whichever is longer; or

15 2) Capped at the total recycling capacity of the existing facility given by the  
16 manufacturer's specifications. In this case, it shall be assumed that the recycling  
17 capacity for each material type  $i$  is equal to the total recycling capacity of the  
18 facility.

## 19 8.2 Project Recycling

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

$$PP_{recyc,y} = \sum_i P_{recyc,i,y} \quad \text{(Equation 4)}$$

21 Where:

22  $PP_{recyc,y}$  = Total plastic waste recycled by the project activity in year  $y$  (tonnes)

23

### 1 **8.3 Eligible Plastic Waste Recycling in the Region**

2 Net plastic waste recycling by the project activity shall not exceed the amount of recyclable plastic  
3 waste in the region that is not recycled. The amount of plastic waste eligible for recycling in the  
4 region shall be determined by comparing the annual amount of recyclable plastic waste generated  
5 to the annual amount recycled in the region. The project proponent shall demonstrate this using  
6 primary surveys or secondary literature available in the public domain and/or certified by a  
7 competent authority.

8 Eligible plastic waste recycling is the amount of recyclable plastic waste in the region that is not  
9 recycled and is calculated as follows:

$$10 \quad EPWR_y = \sum_i (WG_{i,y} - WR_{i,y}) \quad \text{(Equation 5)}$$

11 Where:

12  $EPWR_y$  = Total eligible plastic waste recycling in year  $y$  (tonnes)

13  $WG_{i,y}$  = Total amount of recyclable plastic waste generated in the region for material type  $i$  in year  
14  $y$  (tonnes)

15  $WR_{i,y}$  = Total amount of recyclable plastic waste recycled for material type  $i$  in year  $y$  (tonnes)

16 The annual amount of recyclable plastic waste generated and recycled in the region may vary over  
17 time. Therefore, the total eligible plastic waste recycling may be re-evaluated during each  
18 monitoring period.

### 19 **8.4 Net Recycled Plastic Waste**

20 The net recycled plastic waste is the amount of plastic waste recycled by the project activity that  
21 would not have been recycled otherwise:

$$NP_{recyc,y} = PP_{recyc,y} - BP_{recyc,y} \quad \text{(Equation 6)}$$

22  
23 Where:

24  $NP_{recyc,y}$  = Net recycled plastic waste in year  $y$  (tonnes)

25 If net recycled plastic waste is greater than the eligible plastic waste recycling for the region, the  
26 amount of net recycled plastic waste shall not exceed that of the eligible plastic waste recycling.  
27 This can be calculated as follows:

$$28 \quad \text{Where } NP_{recyc,y} > EPWR_y, NP_{recyc,y} = EPWR_y \quad \text{(Equation 7)}$$

29

# 1 9 MONITORING

## 2 9.1 Data and Parameters Available at Validation

<b>Data / Parameter</b>	$P_{BL,i,y}$
<b>Data unit</b>	tonnes /yr
<b>Description</b>	Amount of material type $i$ recycled in the baseline in year $y$
<b>Equations</b>	Equation 3
<b>Source of data</b>	Based on historical data of recycled material type $i$ or capped at the total recycling capacity of the existing facility as per Section 8.1
<b>Justification of choice of data or description of measurement methods and procedures applied</b>	<p>One of the following options shall be applied:</p> <ul style="list-style-type: none"> <li>a) Average annual recycling rate of material type <math>i</math> over a three-year period prior to the start of the project activity or average annual recycling rate of material type <math>i</math> since the operational start date of the existing facility until the start of the project activity, whichever is longer; or</li> <li>b) Capped at the total recycling capacity of the existing facility given by the manufacturer's specifications. In this case, it shall be assumed that the recycling capacity for each material type <math>i</math> is equal to the total recycling capacity of the facility.</li> </ul>
<b>Purpose of Data</b>	Determination of baseline scenario for capacity addition projects

3

<b>Data / Parameter</b>	$\%SB_{recyc,i}$
<b>Data unit</b>	%
<b>Description</b>	Share of baseline recycled plastic by material type $i$ (%). This is the % of plastic waste that would have been recycled in the baseline scenario in year $y$ .

<b>Equations</b>	Equations 1 and 3
<b>Source of data</b>	Determined based on the procedure in Section 8.1
<b>Frequency of monitoring/recording</b>	For each monitoring period
<b>Purpose of data</b>	Determination of baseline scenario
<b>Comments</b>	For new projects, this parameter is fixed (ex ante). For capacity additions, this parameter is not fixed at validation, but calculated on a yearly basis (ex post).

1

<b>Data / Parameter</b>	$EPWR_y$
<b>Data unit</b>	tonnes/yr
<b>Description</b>	Total eligible plastic waste recycling in year $y$
<b>Equations</b>	Equation 5
<b>Source of data</b>	Primary surveys or secondary literature available in the public domain and/or certified by a competent authority
<b>Justification of choice of data or description of measurement methods and procedures to be applied</b>	Provide justification for the data sources used to determine the annual amount of recyclable plastic waste generated and the annual amount recycled in the region
<b>Frequency of monitoring/recording</b>	Project proponents may re-evaluate the total eligible plastic waste recycling in the region for each monitoring period
<b>Purpose of data</b>	Calculation of net recycled plastic waste

1 **9.2 Data and Parameters Monitored**

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

3

<b>Data / Parameter</b>	$P_{out,i,y}$
<b>Data unit</b>	tonnes/yr
<b>Description</b>	Amount of recycled material type $i$ leaving the facility in year $y$
<b>Equations</b>	Equation 2
<b>Source of data</b>	Direct measurement at project facility
<b>Description of measurement methods and procedures to be applied</b>	Measurement with weight scales of each material type $i$ before leaving the project site.
<b>Frequency of monitoring/recording</b>	Each batch, with at least daily recording
<b>QA/QC procedures to be applied</b>	<p>Calibration of scales shall be conducted according to the equipment manufacturer’s specifications.</p> <p>Cross-checks with sales receipts to final buyer or other equivalent third-party evidence.</p> <p>Cross-checks with input plastic waste per material type <math>i</math> and amount of recycled material type <math>i</math> used for onsite manufacturing of products.</p> <p>The output should be lower or equal to the input for each material type.</p>
<b>Purpose of data</b>	<p>Calculation of baseline recycled plastic waste</p> <p>Calculation of project recycled plastic waste</p>
<b>Comments</b>	If plastic is washed it should be weighed after it has been dried.

4

5

6

1

<b>Data / Parameter</b>	$P_{prod,i,y}$
<b>Data unit</b>	tonnes/yr
<b>Description</b>	Amount of recycled material type $i$ used for onsite manufacturing of products in year $y$ within the manufacturing facility
<b>Equations</b>	Equations 2
<b>Source of data</b>	Direct measurement at project facility
<b>Description of measurement methods and procedures to be applied</b>	Measurement with weight scales of each material type $i$ being used for onsite manufacturing of products in year $y$
<b>Frequency of monitoring/recording</b>	Each batch, with at least daily recording
<b>QA/QC procedures to be applied</b>	Calibration of scales shall be conducted according to the equipment manufacturer's specifications. Cross-checks with input plastic waste per material type $i$ and amount of recycled material type $i$ leaving the facility. The output should be lower or equal to the input for each material type.
<b>Purpose of data</b>	Calculation of baseline recycled plastic waste Calculation of project recycled plastic waste
<b>Comments</b>	If plastic is washed it should be weighed after it has been dried.

2

<b>Data / Parameter</b>	$AFC_i$
<b>Data unit</b>	%
<b>Description</b>	Adjustment factor for composite material $i$

<b>Equations</b>	Equation 2
<b>Source of data</b>	<p><b>Option A:</b> Apply the default factors listed in Table 3 that correspond to the composite materials recycled.</p> <p><b>Option B:</b> Sampling shall be applied to determine the fraction of plastics in the composite material following the most recent version of the CDM Standard Sampling and surveys for CDM project activities and programmes of activities<sup>15</sup> as per section 7.1.</p>
<b>Description of measurement methods and procedures to be applied</b>	The measurement method shall be detailed in the monitoring report. If available for the specific composite material, applicable standards or best-practice shall be applied.
<b>Frequency of monitoring/recording</b>	Projects shall use 90/10 confidence/precision to establish the reliability of sampling efforts and undertake sampling of composite materials at least every 6 months.
<b>QA/QC procedures to be applied</b>	N/A
<b>Purpose of data</b>	<p>Calculation of baseline recycled plastic waste</p> <p>Calculation of project recycled plastic waste</p>
<b>Comments</b>	

<sup>15</sup> CDM Methodology (n.d.). Sampling and surveys for CDM project activities and programmes of activities. Available at: <https://cdm.unfccc.int/Reference/Standards/index.html>

<b>Data / Parameter</b>	$EPWR_y$
<b>Data unit</b>	tonnes/yr
<b>Description</b>	Total eligible plastic waste recycling in year $y$
<b>Equations</b>	Equation 5
<b>Source of data</b>	Primary surveys or secondary literature available in the public domain and/or certified by a competent authority
<b>Justification of choice of data or description of measurement methods and procedures to be applied</b>	Provide justification for the data sources used to determine the annual amount of recyclable plastic waste generated and the annual amount recycled in the region
<b>Frequency of monitoring/recording</b>	Project proponents may re-evaluate the total eligible plastic waste recycling in the region for each monitoring period
<b>Purpose of data</b>	Calculation of net recycled plastic waste

### 2 **9.3 Description of the Monitoring Plan**

3 The project proponent shall establish and apply quality management procedures to manage data  
4 and information. Written procedures shall be established for each measurement task outlining  
5 responsibility, timing and record location requirements. The greater the rigor of the management  
6 system for the data, the easier it will be to conduct an audit for the project.

7 Record keeping practices shall include the following procedures:

- 8 ● Monitor and record all parameters listed in the Section 8.2 during the crediting period.
- 9 ● The amount of each material type recycled by the project is measured with weight scales  
10 before being dispatched to the end-user and before being used for any manufacture of  
11 products within the recycling facility. The amount of plastic waste recycled shall be cross-  
12 checked by:
  - 13 ○ Comparison against the maximum recycling capacity of the facility.
  - 14 ○ Sales receipts to final buyer or other equivalent third-party evidence.

1           ○ Mass balance of input plastic waste, recycled plastic sold/dispatched and recycled  
2 plastic used for onsite manufacturing, where the weight of the total recycled plastic  
3 is always less than or equal to that of the input plastic waste.

4           In case of inconsistencies, a conservative approach of correction shall be taken.

5           ● For plastic waste that enters the project recycling facility and is not recycled or lost through  
6 the recycling process (e.g., plastic that was not able to be recycled due to contamination)  
7 the final destination shall be provided to demonstrate appropriate end-of-life (i.e., reuse,  
8 chemical recycling, mechanical recycling, incineration with energy recovery, managed  
9 landfills and/or incineration without energy recovery).

10          ● The project proponent shall establish, maintain and apply a monitoring plan and information  
11 system that includes criteria and procedures for obtaining, recording, compiling and  
12 analyzing data, parameters and other information important for quantifying and reporting the  
13 amount of recycled plastic waste in the project and baseline scenarios.

14          ● Monitoring procedures shall address the following:

15           ○ Data and information to be reported;

16           ○ Data units;

17           ○ Data sources;

18           ○ Monitoring methods (e.g., estimation, modeling, measurement and calculation);

19           ○ Monitoring equipment;

20           ○ Monitoring frequencies;

21           ○ QA/QC procedures; and

22           ○ Data management system, including the location, backup, and retention of stored  
23 data.

24          ● For the weighing scales, the project proponent shall ensure the equipment is calibrated  
25 according to current good practice (e.g., relevant industry standards or manufacturer  
26 specifications).

27          ● Monitoring personnel shall be trained to ensure that monitoring requirements are carried out  
28 in accordance with the monitoring plan.

29          ● Monitoring roles and responsibilities shall be clearly defined in the project description,  
30 addressing training requirements.

31          ● All data collected as part of monitoring shall be archived electronically and kept for at least  
32 two years after the end of the last project crediting period.

33          ● QA/QC procedures shall include, but are not limited to:

34           ○ Data gathering, input and handling measures;

- 1           ○ Input data checked for typical errors, including inconsistent physical units, unit  
2           conversion errors;
- 3           ○ Typographical errors caused by data transcription from one document to another,  
4           and missing data for specific time periods or physical units;
- 5           ○ Input time series data checked for large unexpected variations (e.g., orders of  
6           magnitude) that could indicate input errors;
- 7           ○ All electronic files to use version control to ensure consistency;
- 8           ○ Physical protection of monitoring equipment;
- 9           ○ Physical protection of records of monitored data (e.g., hard copy and electronic  
10          records);
- 11          ○ Input data units checked and documented;
- 12          ○ All sources of data and assumptions documented.

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