CLEAN DEVELOPMENT MECHANISM

CDM-MP88-A18

Draft Small-scale Methodology

AMS-III.AJ.: Recovery and recycling of materials from solid wastes

Version 09.0

Sectoral scope(s): 13

DRAFT

United Nations
Framework Convention on
Climate Change

COVER NOTE

1. Procedural background

1. The recommended revision of "AMS-III.AJ.: Recovery and recycling of materials from solid wastes" is based on the request for revision "SSC_829: Revision to include the recycling of PVC (Polyvinylchloride) in AMS-III.AJ."

2. Purpose

2. The purpose of this revision is to include applicability conditions and default values of specific fuel consumption (SFC) and specific electricity consumption (SEC) for the recycling of polyvinylchloride (PVC).

3. Key issues and proposed solutions

3. According to the methodology AMS-III.AJ., baseline emissions are determined based on the emissions associated with the production of the polymer from the virgin inputs.

4. The inputs involved in the production of PVC are ethylene, chlorine (Cl_2), ethylene dichloride (EDC) and vynilchloride monomer (VCM), and the processes are the following;

   (a) Ethylene is produced through thermal cracking of naphtha;

   (b) EDC is produced through chlorination of the ethylene, i.e. reacting ethylene with Cl_2;

   (c) VCM is produced through thermal cracking of the EDC; and

   (d) PVC is produced through polymerization of VCM.

5. The following assumptions were employed to determine SEC and SFC:

   (a) The thermal cracking of naphtha to produce ethylene, the production of Cl_2, the chlorination of ethylene and the thermal cracking of EDC involve only the use of thermal energy for heating where:

      (i) A value of 15 GJ/tons of energy needed to produce ethylene from thermal cracking of naphtha was selected from Table 4.3 of the IEA (2007)[1];

      (ii) A value of 25.7 GJ/t of energy needed to produce virgin vinylchloride monomer (VCM) was determined based on the sum between the energy needed to produce ethylene (15 GJ/t, see above), Cl_2 (1.11 GJ/t based on

[1] International Energy Agency (IEA). 2007. *Tracking Industrial Energy Efficiency and CO2 emissions*. Paris: Head of Communication and Information Office.

Saygin et al, 2011[2], and assuming a ratio 0.586 t_{Cl2}/t_{VCM}), EDC (6.98 GJ/t based on Table 4.18 of IEA, 2007, and assuming a ratio 1.58 t_{EDC}/t_{VCM}) and VCM (2.7 GJ/t based on Table 4.18 of IEA, 2007);

(b) The energy needed for the production of the polymers is supplied by electricity, and for PVC a conservative value of 0.18 MWh/t was determined as the weighted average between the PVC produced from suspension and emulsion processes, where the ratios of each production processes over the global production of PVC (85% through S-PVC and 15% through E-PVC) and the specific electricity consumed by each production process are sourced from PlasticsEurope and ECVM[3];

(c) The remaining steps of virgin pellet production (melting and shaping, pelletizing, compounding) require relatively negligible amounts of energy and hence are ignored.

4. Impacts

6. This revision will broaden the applicability of AMS-III.AJ. to the recycling of additional types of plastics.

5. Subsequent work and timelines

7. The methodology is recommended by the MP for consideration by the Board at its 115th meeting. No further work is envisaged.

6. Recommendations to the Board

8. The MP recommends that the Board adopt this draft revised methodology, to be made effective at the time of the Board's approval.

[2] Saygin D, Patel MK; Worrell B, Tam C, Gielen D.J. "Potential of best practice technology to improve energy efficiency in the global chemical and petrochemical sector"; 2011. Available at <https://www.sciencedirect.com/science/article/abs/pii/S0360544211003446?via%3Dihub>, accessed on 12 May 2021.

[3] Association of Plastics Manufacturers in Europe (PlasticsEurope), European Council of Vinyl Manufacturers (ECVM). 2015. *Eco-profiles and Environmental Product Declarations of the European Plastics Manufacturers: Vinyl chloride (VCM) and Polyvinyl chloride (PVC).*

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1. Introduction

1. The following table describes the key elements of the methodology.

Table 1. Methodology key elements

Typical projects	The following materials which are recycled from municipal solid wastes (MSW) and processed into intermediate or finished products are covered in the methodology: • Plastics: HDPE, LDPE, PET, PVC and PP plastic materials; • Container glass cullet; • Metals – Aluminium and Steel
Type of GHG emissions mitigation action	Energy efficiency: Reduction of production of HDPE, LDPE, PET, PVC, PP and container glass from virgin materials, thus reducing related energy consumption

2. Scope, applicability, and entry into force

2.1. Scope

2. This methodology comprises activities for the recovery and recycling of materials in municipal solid waste (MSW)[1] to process them into intermediate or finished products, displacing the production of virgin materials in dedicated facilities, thereby resulting in avoidance of energy use. For paper and cardboard recycling, if the baseline scenario is the decay in a disposal site, the avoided methane emissions may be claimed.

3. The methodology covers the emissions associated with:

   (a) Production of virgin pellets of plastics consisting of either high density polyethylene (HDPE), low density polyethylene (LDPE), Polyethylene Terephthalate (PET), Polyvinyl Chloride (PVC), or Polypropylene (PP). For the sake of this methodology, "plastic" means HDPE, LDPE, PET, PVC and PP, unless otherwise specified;

   (b) Production of container glass using virgin input ("container glass" hereafter) that is displaced by the recycled container glass ("container glass cullet" hereafter) due to the project activity;

   (c) Production of metals (i.e. aluminium and steel)[2] from mined ore or virgin raw materials that is displaced by the recycled metals due to the project activity.

[1] Non-hazardous waste materials suitable for deposition in a solid waste disposal site (SWDS), paper/cardboard refers to post-consumer wastes.

[2] Other metals are not covered under this methodology.

2.2. Applicability

4. The methodology is applicable in the following two cases:

2.2.1. Case A: Project activities that target the participation of the informal waste sector

5. In Case A, the recycling facility is operated by the informal sector. The recycling facility may also receive wastes collected by the formal waste sector (e.g. public collection system). Waste fractions that were already being recycled in the baseline by enterprises in the formal sector cannot be included in the calculations.

6. The following applicability conditions shall apply to project activities under this case:

   (a) The recycling facility may be an existing facility, or a newly implemented facility;

   (b) It is possible to directly measure and record the final output of the recycling facility, that is the weight of materials leaving the recycling facility (on a dry basis), segregated by type;

   (c) Each type of recycled material is sold directly to a processing/manufacturing facility, or to a chain of intermediary retailers that are able to transfer the materials to final identifiable processing/manufacturing facilities that process the segregated fractions;

   (d) The Project Design Document (PDD) shall explain the procedures such as contractual agreements proposed to eliminate double counting of emission reductions, for example due to the formal waste sector or the processing/manufacturing facility, or other parties possibly claiming credits for emission reductions. Similarly, through contractual agreement and other means such as survey/analysis undertaken by a third party, credible proof shall be provided to show that the materials supplied from the recycling facility are used for processing/manufacturing and not for other purposes such as a source of fuel or disposal;

   (e) Emission reductions can be claimed for the difference in energy use for the production of materials from virgin inputs versus production from recycled material. In the case of paper or cardboards, emission reductions due to the avoidance of methane formation in anaerobic decay may be claimed if the baseline scenario is the waste disposal in a disposal site without methane recovery.

2.2.2. Case B: Greenfield facility and/or capacity addition to existing facilities with formal sector participation

7. In Case B, the recycling facility is owned and operated by the formal waste sector. It may receive recyclable materials from the informal waste sector but has no participation of the informal sector in its organization or management functions. The following applicability conditions shall apply under this case:

   (a) If the recycling facility is an existing activity, the average data on the amount of recycled materials from the previous three years of operation (a minimum of one-year data would be required if the facility is less than three years old) shall be used for the estimation of the baseline recycling activity, and project activity shall consist of the increase of the recycling capacity above this level. If the recycling facility is newly implemented as a Greenfield activity, all recycled materials are eligible for

the emission reduction calculation. However, in this case the project participants shall demonstrate that the materials recycled by the project activity are not diverted from other existing recycling facilities belonging to the formal sector, or, alternatively, that it is not a common practice in the region to recover and recycle these materials from municipal solid waste streams by means of formal businesses;

(b) It is possible to directly measure and record the final output of the recycling facility and the input to the final processing/manufacturing facilities, that is the weight of materials leaving the recycling facility and of those entering the processing/manufacturing facilities (on a dry basis),[3] segregated by type;

(c) The recycled materials shall be sold directly to a processing/manufacturing facility, or to a chain of intermediary retailers that are able to transfer the recycled materials to a final identifiable processing/manufacturing facility;

(d) The PDD shall explain how procedures, such as contractual agreements, shall be put in place to eliminate double counting of emission reductions, for example potentially resulting from waste pickers, the recycling facility or the processing/manufacturing facility, or other parties possibly claiming credits for emissions reduction. Similarly, through contractual agreement and other means, credible proof shall be provided to show that the materials supplied from the recycling facility are used for processing/manufacturing and not for other purposes such as a source of fuel or disposal;

(e) For recycling of PVC/PET/PP, the project participants shall demonstrate the chemical equivalence of the recycled PVC/PET/PP to that of PVC/PET/PP made from virgin inputs by the comparison of intrinsic viscosities to ensure that the recycled PVC/PET/PP replaces virgin inputs;

(f) Emission reductions can only be claimed for the difference in energy use for the production of finished products from virgin inputs versus production from recycled materials. In the case of paper or cardboards, emissions reductions due to avoidance of methane formation in anaerobic decay may be claimed, if the baseline scenario is waste disposal in a disposal site without methane recovery.

2.2.3. Applicability conditions for both cases i.e. Case A and Case B

8. In any of the above cases the project proponent shall be able to demonstrate, using three years[4] historic data (market data, official statistics etc.) prior to the start date of the project activity, that the finished products (HDPE, LDPE, PET, PVC, PP, steel aluminium, paper and cardboard and glass) were manufactured in the host country of the CDM project using either virgin raw materials produced in country or virgin raw materials imported from another non-Annex I country. This analysis may be limited to only those finished products where recycled materials have proven to be a technically viable option, that is those types of products that are expected to be the end products produced from materials recycled as part of the project activity.

[3] If multiple processes or facilities are involved, consider the final weight of the clean and dry material.

[4] A minimum of one-year data would be required if the facility is less than three years old.

9. As an alternative to the requirement stipulated in paragraph 8 above, the project proponents may choose to adjust the baseline emissions by using the baseline correction factor (B_i) as described under the baseline section below.

10. The recycling facility shall source its materials from MSW; materials from an unknown source are not eligible under this methodology. The project activity consists of separation of the recyclables from bulk MSW by means of manual or magnetic or mechanical separations. If the project activity involves the collection of wastes on a door to door basis, or collection at recipient's containers for the voluntary dispensing of wastes by the local community, all recyclables (paper, plastics, glass, etc.) processed by the recycling plant shall be collected together, selective collection of metals or any other wastes is excluded. As a consequence, wastes not pertaining to the identified baseline waste collection and destination stream that would not be delivered to the baseline disposal site and/or treatment plant (e.g. incineration) are not eligible.

11. In the specific case of metals, the methodology excludes collection of the scraps generated from the production process of primary/secondary/finished metal and materials or in the processing of the finished metal and materials into final products, and it covers only postconsumer obsolete wastes[5]. Project proponents shall provide evidence that the materials recycled under the project activity are recovered only from end-of-life-wastes and project activity does not divert waste from any historically existing informal or formal recycling activity.

12. For the projects involving the recycling of PVC, only facilities that employ mechanical recycling are eligible.

13. The amount of fuel and electricity consumed by the recycling facility can be measured and recorded.

14. Project proponents shall demonstrate that the properties of the materials produced from waste recycling are the same as those from virgin materials. For example, if the waste materials such as recycled plastic bottles are converted into building blocks or roof tiles, the emission reductions based on displacement of original virgin materials cannot be claimed under this methodology. For recycled materials, project proponents shall provide documentation proving that the properties of the materials produced are comparable according to standard testing methods for each material.

15. Measures are limited to those that result in aggregate emission reductions of less than or equal to 60ktCO_2 equivalent annually.

2.3. Entry into force

16. The date of entry into force is the date of the publication of the EB ### meeting report on DD Month 2022.

[5] Post-consumer obsolete wastes cover for example small domestic appliances in the daily waste collection system, and it excludes collection of large devices such as refrigerators, vehicles. This is because these devices are usually scrapped and not treated and disposed together with MSW as assumed by this methodology; further recycling/recovery of metals from such devices would potentially involve emissions due to physical leakage of refrigerants and accounting such emissions are not under the scope of this methodology.

2.4. Applicability of Sectoral Scopes

17. For validation and verification of CDM projects and programme of activities by a designated operational entity (DOE) using this methodology, application of sectoral scope 13 is mandatory.

3. Normative references

18. Project participants shall apply the "General guidelines for SSC CDM methodologies"~~,~~ and "~~Guidelines on the~~ TOOL21: Demonstration of additionality of small-scale project activities" provided at <http://cdm.unfccc.int/methodologies/SSCmethodologies/approved.html>.

19. This methodology also refers to the latest approved version of the following approved methodology:

    (a) "AMS-III.BA.: Recovery and recycling of materials from E-waste" (hereinafter referred to as AMS-III.BA.);

    (b) "TOOL03: Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion" (hereinafter referred to as TOOL03);

    (c) "TOOL04: Emissions from solid waste disposal sites" (hereinafter referred to as TOOL04);

    (d) "TOOL05: Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation" (hereinafter referred to as TOOL05);

    (e) "TOOL07: Tool to calculate the emission factor for an electricity system" (hereinafter referred to as TOOL07);

    (f) "TOOL09: Determining the baseline efficiency of thermal or electric energy generation systems" (hereinafter referred to as TOOL09).

4. Definitions

20. The definitions contained in the Glossary of CDM terms shall apply.

21. For the purpose of this methodology the following definitions apply:

    (a) **Mechanical Recycling** - physical/mechanical processes by which recyclable materials are obtained from municipal solid waste by way of separation, cleaning and compaction/packing (for plastics and paper) or grinding (for container glass) for further processing in order to produce intermediate/finished products to substitute virgin raw materials in an industrial production chain. The process may be accomplished manually and/or using mechanical equipment including one or more of the following measures: washing of the separated materials with hot water, drying, compacting, shredding or pelletizing;

    (b) **Recycling facility** - facility(ies) where the recyclable fraction of the collected municipal solid waste is sorted, classified and prepared into marketable

commodities for processing/manufacturing in single or multiple locations.[6] In the case of plastics recycling, washing with hot water to clean the plastic to free it from extraneous materials is an essential part of this activity and associated emissions shall be monitored and accounted as project emissions. Similarly, the recycling of container glass cullet is an essential part of the project activity and associated emissions shall be accounted as project emissions. For steel and aluminium, the separation of these metals from extraneous non-metallic pieces present in the recycled wastes (e.g. plastics or glass) shall also take part at the recycling facility;

(c) **Processing/Manufacturing facility** - includes industrial processes to transform recyclable materials obtained from the recycling facility into intermediate or finished products that is plastic resin, i.e. production of recycled plastic resin or pellets and/or the glass manufacturing facility where the container glass cullet is melted;

(d) **Informal Waste Sector** - individuals or a group of individuals who are involved in waste management activities but are not formally registered or formally responsible for providing the waste management services. Newly established formalized organizations of such individuals, that is cooperatives, can also be considered as the informal sector for the purpose of this methodology;

(e) **Formal Waste Sector** - solid 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.

5. Baseline methodology

5.1. Project boundary

22. The project boundary includes the physical geographical sites of:

(a) Waste collection sites (e.g. door-to-door collection);

(b) The recycling facility;

(c) Processing/manufacturing facility;

(d) Virgin material production[7];

(e) MSW disposal site or treatment plant in the baseline scenario.

5.2. Baseline emissions

23. Baseline emissions include:

(a) For the production of plastic, the emissions associated with energy consumption for the production of plastic pellets from virgin plastic materials;

[6] The recycling facility includes final segregation of the waste types and no further segregation occurs in the Processing/Manufacturing facility.

[7] Virgin material production is included in the project boundary, even if it is not an identifiable site, because the emission factor for virgin material production for baseline calculation is based on the assumptions on the typical conditions for the virgin material production in the host country or in a non-Annex I country.

(b) For paper and cardboard, the emissions associated with the anaerobic decay within a disposal site may be claimed;

(c) For the production of glass, emissions associated with the energy consumption for the production of virgin container glass corresponding to the preparation and mixing of raw materials before the melting stage[8];

(d) For the production of metals, emissions associated with energy consumption for the production from virgin materials.

24. Baseline emissions shall be determined as:

$$BE_y = BE_{plastic,y} + BE_{paper,y} + BE_{glass,y} + BE_{metal,y} \quad \text{Equation (1)}$$

Where:

BE_y	=	Baseline emissions in year *y* (tCO_2e)
$BE_{plastic,y}$	=	Baseline emissions associated with the recycling of plastic in year *y* (tCO_2e)
$BE_{paper,y}$	=	Baseline emissions associated with the recycling of paper and cardboard year *y* (tCO_2e)
$BE_{glass,y}$	=	Baseline emissions associated with the recycling of glass year *y* (tCO_2e)
$BE_{metal,y}$	=	Baseline emissions associated with the recycling of metals in year *y* (tCO_2e)

25. Only the baseline emissions which would take place in non-Annex I countries shall be credited. Therefore, in the case where requirements stipulated under paragraph 8 cannot be met, the baseline emissions calculated for the total amount of recycled materials obtained in the project activity are adjusted by a correction factor B_i, calculated as the ratio of the production of the material *"i"* in non-Annex I countries and the total production of this material in the world. See the Table 2 below. These correction factors shall be updated at each renewal of the crediting period, and project participants shall use the values from the latest version of the methodology at renewal of the crediting period.

Table 2. Baseline correction factor for metals, plastics and glass from virgin materials

Metal/Plastic	Bi adjustment factor based on the share of the production in non-Annex I countries[(a)]
Aluminium	0.72
Steel	0.68
PET	~~0.56~~0.60
HDPE	~~0.56~~0.60
LDPE	~~0.56~~0.60
PP	~~0.56~~0.60

[8] Project proponent is encouraged to submit proposals to revise the methodology to include emissions avoided associated with the acquisition of raw materials and CO_2 emissions avoided from the use of carbonated materials (such as limestone and soda) in the glass manufacturing process.

Metal/Plastic	Bi adjustment factor based on the share of the production in non-Annex I countries[(a)]
PVC	~~0.56~~0.60
Glass	0.67

[(a)] For details on how the values of B_i were determined, please refer to Appendix 1 of AMS-III.BA.~~: Recovery and recycling of materials from E-waste"~~. For plastics, values of B_i were sourced from PlasticsEurope and EPRO[9].

5.2.1. Baseline emissions associated with the recycling of plastics

26. Baseline emissions associated with the recycling of plastics type *i* from virgin inputs are calculated based on the consumption of plastic type *i* is produced in the host Country as well as imported, using the equation below:

$$BE_{plastic,y} = \sum_i \left[Q_{i,y} \times L_i \times \left(w_{i,in-country,y} \times SE_{i,in-country,y} + w_{i,imported,y} \times SE_{i,imported,y}\right)\right] \quad \text{Equation (2)}$$

Where:

$BE_{plastic,y}$	=	Baseline emissions associated with the recycling of plastic in year *y* (tCO_2e)
i	=	Indices for material type *i* (i = 1,2,3,4 for HDPE, LDPE, PET, PVC and PP)
$Q_{i,y}$	=	Quantity of plastic type *i* recycled in year *y* (t/y)
L_i	=	Net to gross adjustment factor to cover degradation in material quality and material loss in the production process of the final product using the recycled material (use 0.75)
$w_{i,in-country,y}$	=	Percentage of plastics produced in the host Country out of total plastic consumed in year *y* (%)
$SE_{i,in-country,y}$	=	Specific emissions in the baseline for the production of virgin plastics type *i* in the host Country in year *y* (tCO_2/t_i)
$w_{i,imported,y}$	=	Percentage of imported plastics out of total plastic consumed in year *y* (%)
$SE_{i,imported,y}$	=	Specific emissions in the baseline for virgin plastics type *i* imported in year *y* (tCO_2/t_i)

27. Specific emissions in the baseline for the production of virgin plastics type *i* in the host Country ($SE_{i,in-country,y}$) are determined based on the equation below:

$$SE_{i,in-country,y} = \left(SEC_{BL,i} \times EF_{BL,el,y}\right) + \left(SFC_{BL,i} \times EF_{BL,FF,CO2}\right) \quad \text{Equation (3)}$$

Where:

$SEC_{BL,i}$	=	Specific electricity consumption in the production of virgin material type *i* (MWh/t_i)

[9] Association of Plastics Manufacturers in Europe (PlasticsEurope), European Association of Plastics Recycling and Recovery Organisations (EPRO). 2022. *Plastics – the Facts 2021*. Available at <https://plasticseurope.org/wp-content/uploads/2021/12/Plastics-the-Facts-2021-web-final.pdf>, accessed on 29 June 2022.

$EF_{BL,el,y}$	=	Emission factor for the baseline electricity consumption for virgin plastic production in the host party (tCO_2/MWh)
$SFC_{BL,i}$	=	Specific fuel consumption for the production of virgin material type *i* (GJ/t_i)
$EF_{BL,FF,CO2}$	=	CO_2 emission factor of the baseline fossil fuel (tCO_2/GJ). Project participants shall assume that the baseline fuel is natural gas when it's not possible to identify the type of fuel consumed for the production of plastics from virgin materials

28. Specific emissions in the baseline for virgin plastics type *i* imported ($SE_{i,imported,y}$) are determined based on the equation below:

$$SE_{i,imported,y} = \sum_i \left[B_i \times \left(SEC_{BL,i} \times EF_{el,imported} + SFC_{BL,i} \times EF_{FF,imported,CO2}\right)\right] \quad \text{Equation (4)}$$

Where:

B_i	=	Correction factor based on share of production in non-Annex I countries, as specified in Table 2. Apply a value of 1.0 when requirement stipulated under para 25 is met
$EF_{el,imported}$	=	Emission factor for the baseline electricity consumption for the portion of plastic that is imported (tCO_2/MWh). Apply a default value of 0.24 tCO_2/MWh
$EF_{FF,imported,CO2}$	=	CO_2 emission factor for fossil fuel (tCO_2/GJ). Assume that natural gas supplies the energy needed to produce the virgin plastic imported if it is not possible to identify the fuel type

29. The values of the parameters $SEC_{BL,i}$ and $SFC_{BL,i}$ are illustrated in the table below:

Table 3. Values of specific energy and fuel consumptions for the production of different plastics types *i* from virgin materials

Plastic types	$SEC_{BL,i}$ (MWh/t_i)[(a)]	$SFC_{BL,i}$ (GJ/t_i)[(a)]
PET	1.11	15.0
HDPE	0.83	15.0
LDPE	1.67	15.0
PVC	0.18	25.7
PP	0.56	11.6

(a) The following conservative assumptions were made to derive the default values contained in the table above:

1. The ~~energy needed for the roduction of the~~ virgin monomers Ethylene, Propylene, Ethylene Glycol[10] and Terephthalic Acid[10] are produced through thermal cracking of naphtha~~olefins is supplied by natural gas~~.

[10] For the production of the monomers Ethylene Glycol Terephthalic Acid, it was conservatively estimated that the energy needed is the same for the production of the same mass of ethylene through thermal cracking.

2. A ~~conservative~~ value of 15 GJ/tons of energy needed to produce ethylene from thermal cracking of naphtha was selected from Table 4.3 of the IEA (2007)[11];
3. A value of 11.6 GJ/t of energy needed to produce propylene from thermal cracking of naphtha was sourced from Saygin et al (2011)[12], as the sum of the specific energy consumed from the best practice technologies (13.1 GJ/t) and the specific energy needed to produce the steam (-1.5 GJ/t) provided in Table 1;
4. ~~4.~~ A value of 25.7 GJ/t of energy needed to produce virgin vinylchloride monomer (VCM) was determined based on the sum between the energy needed to produce ethylene (15 GJ/t, see above), chlorine (1.11 GJ/t based on Saygin et al, 2011, and assuming a ratio 0.586 t_{Cl2}/t_{VCM}), ethylene dichloride-EDC (6.98 GJ/t based on Table 4.18 of IEA, 2007, and assuming a ratio 1.58 t_{EDC}/t_{VCM}) and VCM (2.7 GJ/t based on Table 4.18 of IEA, 2007);
5. The energy needed for the production of the polymers is supplied by electricity:
   (a) For HDPE, LDPE and PP, the most conservative values from Table 4.9 of the IEA (2007) were selected and divided by 3.6 to convert to MWh/t;
   (b) For PET, a conservative value of 4.0 GJ/t (divided by 3.6 to convert MWh/t) was sourced from Table 1 of Saygin et al (2011).
   (c) For PVC, a conservative value of 0.18 MWh/t was determined as the weighted average between the PVC produced from suspension and emulsion processes, where the ratios of each production processes over the global production of PVC (85% through S-PVC and 15% through E-PVC) and the specific electricity consumed by each production process are sourced from PlasticsEurope and ECVM[13].
6. The remaining steps of virgin pellet production (melting and shaping, pelletizing, compounding) require relatively negligible amounts of energy and hence are ignored.

30. The emission factor for the baseline electricity consumption for virgin plastic production in the host party (parameter $EF_{BL,el,y}$) shall be determined based on the weighted average consumption of electricity from the electric grid(s) and from captive power plant(s) as indicated in the equation below. Project participants may choose to fix this parameter ex ante and update it at the renewal of the crediting period or monitor this parameter ex post. If the parameter is fixed ex ante, it shall be calculated using the most recent data available. Otherwise, a default value of 0.24 tCO_2/MWh[14] shall be applied:

$$EF_{BL,el,y} = \frac{\sum_k EF_{BL,grid,k,y} \times EC_{BL,grid,k,y} + \sum_j EF_{BL,captive,j,y} \times EC_{BL,captive,j,y}}{\sum_k EC_{BL,grid,k,y} + \sum_j EC_{BL,captive,j,y}} \quad \text{Equation (5)}$$

[11] International Energy Agency (IEA). 2007. *Tracking Industrial Energy Efficiency and CO2 emissions*. Paris: Head of Communication and Information Office.

[12] Saygin D, Patel MK, Worrell B, Tam C, Gielen DJ. 2011. *Potential of best practice technology to improve energy efficiency in the global chemical and petrochemical sector.* Available at <https://www.sciencedirect.com/science/article/abs/pii/S0360544211003446?via%3Dihub>, accessed on 12 May 2021.

[13] Association of Plastics Manufacturers in Europe (PlasticsEurope), European Council of Vinyl Manufacturers (ECVM). 2015. *Eco-profiles and Environmental Product Declarations of the European Plastics Manufacturers: Vinyl chloride (VCM) and Polyvinyl chloride (PVC).*

[14] This default value is determined assuming electricity is supplied by a natural gas cogeneration plant with an efficiency of 83% (the efficiency is sourced from the Table 2 of the Appendix of the "TOOL09~~: Determining the baseline efficiency of thermal or electric energy generation systems"~~).

Where:

$EF_{BL,grid,k,y}$	=	Emission factor of the grid *k* supplying electricity to produce virgin plastics in the host country in year *y* (tCO_2/MWh)
$EC_{BL,grid,k,y}$	=	Electricity consumed from the grid *k* to produce virgin plastics in the host country in year *y* (MWh)
$EF_{BL,captive,j,y}$	=	Emission factor of the captive power plant *j* supplying electricity to produce virgin plastics in the host country (tCO_2/MWh)
$EC_{BL,captive,j,y}$	=	Electricity consumed from the captive power plant *j* to produce virgin plastics in the host country in year *y* (MWh)

31. If project participants can't identify the sources to determine the baseline emissions from plastics produced in the host Country, a simplified approach can be applied assuming that all plastic consumed in the host Country is imported and a weight of 0 is assigned to $w_{i,in\text{-}country,y}$ and 1 to $w_{i,imported,y}$ in Equation 2.

5.2.2. Baseline emissions associated with the recycling of paper and cardboard

32. Baseline emissions for the anaerobic decay of paper and cardboard in the solid waste disposal site are calculated using the latest version of ~~the methodological tool~~ TOOL04.

5.2.3. Baseline emissions associated with the recycling of glass

33. Baseline emissions for the production of container glass from virgin inputs are calculated using following equation:

$$BE_{glass,y} = Q_{glass,y} \times L_{glass} \times B_i \times SEC_{Bl,glass} \times EF_{el,PJ,y} \quad \text{Equation (6)}$$

Where:

$Q_{glass,y}$	=	Quantity of glass cullet recycled by the project activity in year *y* (t)
L_{glass}	=	Net to gross adjustment factor to cover degradation in material quality and material loss in the production process of the final product using the recycled material (use 0.88)
$SEC_{Bl,glass}$	=	Specific electricity consumption for the production of raw materials displaced by the glass recycling (MWh/t), take the value specified in paragraph 34(c)
$EF_{el,PJ,y}$	=	Emission factor of the electric grid supplying electricity to the recycling facility in year *y* (tCO_2/MWh)

34. The following conservative assumptions were made to determine the baseline emissions for the production of container glass from virgin inputs:

(a) Container glass cullet will displace only the preparation and mixing of raw materials before the melting stage;

(b) The only source of energy consumed by the preparation and mixing of raw materials is electricity – no fossil-fuels are used;

(c) The default value for SEC (specific electricity consumption) of 0.026 MWh/t_{glass} shall be used[15];

(d) The remaining steps of container glass production are not considered because the use of container glass cullet does not avoid melting and the subsequent steps of the glass manufacturing process (i.e. forming and post-forming).

5.2.4. Baseline emissions associated with the recycling of metals

35. Baseline emissions for the production of metal type *i* from virgin inputs are calculated using the equation below:

$$BE_{metal,y} = \sum_{i} Q_{i,y} \times B_i \times SE_i \qquad \text{Equation (7)}$$

Where:

i	=	Metal type *i* (*i* = 5, 6 for Steel and Aluminium)
$Q_{i,y}$	=	Quantity of metal type *i* (Steel or Aluminium) recycled and sent to a processing or manufacturing facility in year *y* (t)
SE_i	=	Specific CO_2 emission factor for production of metal *i* (tCO_2/t), take the value specified in Table 4 below

36. The specific CO_2 emission factors are indicated in below. These values shall be updated at each renewal of the crediting period, in accordance with the latest version of the methodology.

Table 4. Specific CO_2 emission factor for production of metals

Metal	Specific CO_2e emission factor for production of metals (tCO_2/t)
Aluminium	8.40[(a)]
Steel	1.27[(b)]

[(a)] For details on how the emission factor for the production of aluminium was determined, please refer to Appendix 2 of the methodology AMS-III.BA~~: Recovery and Recycling of E-waste"~~.

[(b)] For details on how the emission factor for the production of steel was determined, please refer to Appendix 3 of the methodology AMS-III.BA.~~: Recovery and Recycling of E-waste"~~

5.3. Project emissions

37. Project emissions include emissions associated with the energy use at recycling facility and at the processing facility, and are calculated based on the equation below. No project emissions need to be considered in the case of paper and cardboard.

[15] Source: *"Revision of AMS-III.AJ methodology to cover glass – Conservativeness study for the baseline calculation"*, prepared by ALLCOT Group, aavailable at <http://cdm.unfccc.int/UserManagement/FileStorage/NC0TF6YEJU8GMVIK49D1LBSWP3HRO2>.

38. For project activities where the recycling facility includes both waste sorting and processing, project emissions are calculated through the equation below:

$$PE_y = EC_{PJ,y} \times EF_{el,PJ,y} + \sum_f \left(FC_{f,PJ,y} \times NCV_{f,y} \times EF_{f,CO2,y}\right) \quad \text{Equation (8)}$$

Where:

PE_y	=	Project emissions in year *y* (tCO_2)
i	=	Material type *i* (i = 1, 2, 3, 4, 5, 6, 7, 8, 9 for HDPE, LDPE, PET, PVC, PP, aluminium, steel, paper, cardboard and container glass cullet)
$Q_{i,y}$	=	Quantity of material type *i* recycled in year *y* (t)
$EC_{PJ,y}$	=	Electricity consumed by the recycling facility in year *y* (MWh)
$FC_{f,PJ,y}$	=	Fuel type *f* consumed by the recycling facility in year *y* (unit mass or volume/t)
$NCV_{f,y}$	=	Net calorific value of the fossil fuel type *f* consumed in the recycling facility in year *y* (GJ/unit mass or volume)
$EF_{f,CO2,y}$	=	CO_2 emission factor of the fossil fuel type *f* consumed at the recycling facility in year *y* (tCO_2/GJ)

39. For project activities where the recycling facility includes only waste sorting and the waste processing is done by a third-party processing plant, project emissions are determined through the equation below:

$$PE_y = EC_{PJ,y} \times EF_{el,PJ,y} + \sum_f \left(FC_{f,PJ,y} \times NCV_{f,y} \times EF_{f,CO2,y}\right) + \sum_i \left\{ Q_{i,y} \times \left[SEC_{P,i} \times EF_{el,PJ,y} + \sum_f \left(SFC_{f,i,PJ,y} \times NCV_f \times EF_{f,CO2}\right) \right] \right\} \quad \text{Equation (9)}$$

Where:

$SEC_{P,i}$	=	Specific electricity consumption factor for processing of recycled material *i* in the processing/manufacturing facility *P* (MWh/t). Use the following values: • 0.66 for aluminium; • 0.9 for steel; • 0 for plastics and glass[16]
$SFC_{f,i,PJ,y}$	=	Specific consumption of fuel type *f* by the processing facility apportioned to material type *i* in year *y* (unit mass/t or volume/t)

[16] Emissions associated with transportation of recyclable materials and processing/manufacturing under the project activity are considered as equivalent to the corresponding emissions for the virgin materials and therefore ignored in this methodology.

40. For project activities that fall under Case A, the parameters $EC_{PJ,y}$ and $FC_{f,PJ,y}$ may be estimated based on the nameplate specific energy consumption of the equipment used and the average time of operation and level of service delivered [17], or based on measurement campaigns of the energy consumption under typical operation conditions.

41. For the recycling of plastics, project emissions may alternatively be calculated using the equation below.

$$PE_y = \sum_i Q_{i,y} \times SEC_{rec} \times EF_{el,PJ,y} \quad \text{Equation (10)}$$

Where:

SEC_{rec} = Specific electricity consumption for the recycling of plastic type *i*, use 0.83 MWh/t (3 GJ/t) for HDPE/LDPE/PET/PVC/PP

42. If the recycling plant is claiming emission reductions for only part of recycled materials (e.g. only for plastics and not for metals), project emissions may be allocated to each mass unit of segregated material by gross sales revenues, that is apportioning the emissions proportional to the market prices of plastics, metals, organics, glass and paper etc. and their respective throughput. The market prices are the average prices of recycled materials paid by processing units/retailers to the recycling plants, may be either monitored ex post or be determined once for the crediting period. This rule can be applied only if transparent and reliable information on market prices is available. Alternatively, as a conservative approach, all project emissions shall be allocated to recycled material.

43. The following formulas may be used to allocate project emissions to each mass unit of segregated material *s* by market prices:

$$EC_{i,PJ,y} = EC_{PJ,y} \times \frac{Q_{i,y} \times \$_{i,y}}{\sum_s (Q_{s,y} \times \$_{s,y})} \quad \text{Equation (11)}$$

$$FC_{f,i,PJ,y} = FC_{f,PJ,y} \times \frac{Q_{i,y} \times \$_{i,y}}{\sum_s (Q_{s,y} \times \$_{s,y})} \quad \text{Equation (12)}$$

$$PE_y = \sum_i Q_{i,y} \times \left[EC_{i,PJ,y} \times EF_{el,PJ,y} + \sum_f \left(FC_{f,i,PJ,y} \times NCV_{f,y} \times EF_{f,CO2,y} \right) \right] \quad \text{Equation (13)}$$

Where:

S = Type of material segregated at the recycling facility with a market price, including plastic and other marketable items such as organics

[17] In case the nameplate energy consumption and/or service provided by the equipment used in the recycling facility in Case A are unknown, they may be estimated by a local expert in order to define a locally applicable emission factor for the recycling plant.

$EC_{i,PJ,y}$	=	Total electricity consumption of the recycling facility in year *y* apportioned to product *i* (MWh)
$FC_{f,i,PJ,y}$	=	Total fossil fuel type *f* consumption of the recycling facility in year *y* apportioned to product *i* (unit mass or volume)
$Q_{s,y}$	=	Quantity of material type *s* segregated in the recycling facility in year *y* (t)
$\$_{i,y}$	=	Sale price of the product *i* in year *y*
$\$_{s,y}$	=	Sale price of the segregated material type *s* in year *y*

5.4. Leakage

44. If it is demonstrated that organic biogenic waste segregated in the recycling facility would otherwise have been deposited in a landfill without methane recovery in the baseline scenario, or if the baseline scenario is the incineration of the wastes, then no leakage calculation is required.

5.5. Emission reductions

45. The emission reductions achieved by the project activity shall be determined as the difference between the baseline emissions and the project emissions and leakage.

$$ER_y = BE_y - PE_y - L_y \quad \text{Equation (14)}$$

Where:

ER_y	=	Emission reductions in year *y* (t CO_2e)
L_y	=	Leakage emissions in year *y* (t CO_2e)

6. Monitoring methodology

46. The following parameters as indicated in section 6.1 below shall be monitored and recorded during the crediting period. The applicable requirements specified in the "General guidelines for SSC CDM methodologies" are also an integral part of the monitoring guidelines specified below and therefore shall be referred to by the project participants.

6.1. Data and parameters monitored

Data / Parameter table 1.

Data / Parameter:	***$Q_{s,y}$, $Q_{i,y}$ and Q_{glass}***
Data unit:	t
Description:	***$Q_{i,y}$*:** Quantity of material *i* recycled and sent to a processing or manufacturing facility in year *y* (i=1,2,3,4,5,6,7,8 for HDPE, LDPE, PET, PVC, PP, aluminium, steel, paper and cardboard) ***Q_{glass}*:** Quantity of glass cullet recycled by the project activity in year *y* ***$Q_{s,y}$*:** Quantity of material type *s* segregated in the recycling facility in year *y*
Source of data:	-

Measurement procedures (if any):	Direct weighing and recording of the weight, cross checked with company's records that is invoiced and backed by receipt of payments. For the case of plastic type *i* in Case B, cross-check with the mass of product(s) used at the processing/ manufacturing facility using production records[18]
Monitoring frequency:	Recorded at the time of sending each consignment from recycling facility to processing/ manufacturing facility or other customers
QA/QC procedures:	-
Any comment:	-

Data / Parameter table 2.

Data / Parameter:	$w_{i,in-country,y}$
Data unit:	%
Description:	Percentage of plastics produced in the host party out of total plastic consumed in year *y*
Source of data:	Sectoral reports, peer-reviewed studies or national/sectoral statistics
Measurement procedures (if any):	-
Monitoring frequency:	Annual
QA/QC procedures:	-
Any comment:	-

Data / Parameter table 3.

Data / Parameter:	$w_{i,imported,y}$
Data unit:	%
Description:	Percentage of imported plastics out of total plastic consumed in year *y*
Source of data:	Sectoral reports, peer-reviewed studies or national/sectoral statistics
Measurement procedures (if any):	-
Monitoring frequency:	Annual
QA/QC procedures:	-
Any comment:	-

Data / Parameter table 4.

Data / Parameter:	$EF_{BL,grid,k,y}$
Data unit:	tCO_2/MWh
Description:	Emission factor of the electric grid supplying electricity to the recycling facility in year *y*

[18] This is to ensure that the recycled HDPE and LDPE are further utilized and substitute virgin raw materials.

Source of data:	The monitoring provisions of the parameter $EF_{grid,CM,y}$ from the latest version of ~~the~~ TOOL07 apply
Measurement procedures (if any):	The monitoring provisions of the parameter $EF_{grid,CM,y}$ from the latest version of ~~the~~ TOOL07 apply
Monitoring frequency:	The monitoring provisions of the parameter $EF_{grid,CM,y}$ from the latest version of ~~the~~ TOOL07 apply
QA/QC procedures:	The monitoring provisions of the parameter $EF_{grid,CM,y}$ from the latest version of ~~the~~ TOOL07 apply
Any comment:	The monitoring provisions of the parameter $EF_{grid,CM,y}$ from the latest version of ~~the~~ TOOL07 apply

Data / Parameter table 5.

Data / Parameter:	$EF_{el,PJ,y}$
Data unit:	tCO_2/MWh
Description:	Emission factor of the electric grid supplying electricity to the latest version of the recycling facility in year *y*
Source of data:	The monitoring provisions of the parameter $EF_{grid,CM,y}$ from the latest version of ~~the~~ TOOL07 apply
Measurement procedures (if any):	The monitoring provisions of the parameter $EF_{grid,CM,y}$ from the latest version of ~~the~~ TOOL07 apply
Monitoring frequency:	The monitoring provisions of the parameter $EF_{grid,CM,y}$ from the latest version of ~~the~~ TOOL07 apply
QA/QC procedures:	The monitoring provisions of the parameter $EF_{grid,CM,y}$ from the latest version of ~~the~~ TOOL07 apply
Any comment:	The monitoring provisions of the parameter $EF_{grid,CM,y}$ from the latest version of ~~the~~ TOOL07 apply

Data / Parameter table 6.

Data / Parameter:	$EC_{BL,grid,k,y}$
Data unit:	MWh
Description:	Electricity consumed from the grid *k* to produce virgin plastics in the host country in year *y*
Source of data:	The monitoring provisions of the parameter $EC_{BL,k,y}$ from the latest version of ~~the~~ TOOL05 apply
Measurement procedures (if any):	The monitoring provisions of the parameter $EC_{BL,k,y}$ from the latest version of ~~the~~ TOOL05 apply
Monitoring frequency:	The monitoring provisions of the parameter $EC_{BL,k,y}$ from the latest version of ~~the~~ TOOL05 apply
QA/QC procedures:	The monitoring provisions of the parameter $EC_{BL,k,y}$ from the latest version of ~~the~~ TOOL05 apply
Any comment:	The monitoring provisions of the parameter $EC_{BL,k,y}$ from the latest version of ~~the~~ TOOL05 apply

Data / Parameter table 7.

Data / Parameter:	$EF_{BL,captive,j,y}$
Data unit:	tCO_2/MWh
Description:	Emission factor of the captive power plant *j* supplying electricity to produce virgin plastics in the host country
Source of data:	The provisions to determine the parameter $EF_{EL,k,y}$ from the latest version of ~~the~~ TOOL05 apply
Measurement procedures (if any):	The monitoring provisions of the parameter $EF_{EL,k,y}$ from the latest version of ~~the~~ TOOL05 apply
Monitoring frequency:	The monitoring provisions of the parameter $EF_{EL,k,y}$ from the latest version of ~~the~~ TOOL05 apply
QA/QC procedures:	The monitoring provisions of the parameter $EF_{EL,k,y}$ from the latest version of ~~the~~ TOOL05 apply
Any comment:	The monitoring provisions of the parameter $EF_{EL,k,y}$ from the latest version of ~~the~~ TOOL05 apply

Data / Parameter table 8.

Data / Parameter:	$EC_{BL,captive,j,y}$
Data unit:	MWh
Description:	Electricity consumed from the captive power plant *j* to produce virgin plastics in the host country in year *y*
Source of data:	The monitoring provisions of the parameter $EC_{BL,k,y}$ from the latest version of ~~the~~ TOOL05 apply
Measurement procedures (if any):	The monitoring provisions of the parameter $EC_{BL,k,y}$ from the latest version of ~~the~~ TOOL05 apply
Monitoring frequency:	The monitoring provisions of the parameter $EC_{BL,k,y}$ from the latest version of ~~the~~ TOOL05 apply
QA/QC procedures:	The monitoring provisions of the parameter $EC_{BL,k,y}$ from the latest version of ~~the~~ TOOL05 apply
Any comment:	The monitoring provisions of the parameter $EC_{BL,k,y}$ from the latest version of ~~the~~ TOOL05 apply

Data / Parameter table 9.

Data / Parameter:	$EC_{PJ,y}$
Data unit:	MWh
Description:	Electricity consumed by the recycling facility in year *y*
Source of data:	Records from the recycling facility
Measurement procedures (if any):	As per the latest version of ~~the methodological tool~~ TOOL05. When applying the tool, requirements for $EG_{PJ,grid,y}$ and/or $EG_{PJ,y}$ specified in the tool should apply to electricity consumed form the grid and electricity consumed from the captive power plant
Monitoring frequency:	As per the latest version of ~~the tool~~ TOOL05
QA/QC procedures:	As per the latest version of ~~the tool~~ TOOL05
Any comment:	-

Data / Parameter table 10.

Data / Parameter:	$FC_{f,PJ,y}$
Data unit:	As per the latest version of TOOL03
Description:	Fossil fuel type *f* consumption of the recycling facility in year *y*
Source of data:	-
Measurement procedures (if any):	As per the latest version of TOOL03. When applying the tool, requirements for $FC_{i,j,y}$ should apply to the total fossil fuel consumption at the recycling facility
Monitoring frequency:	As per the latest version of TOOL03
QA/QC procedures:	As per the latest version of TOOL03
Any comment:	-

Data / Parameter table 11.

Data / Parameter:	$NCV_{f,y}$
Data unit:	As per latest version of ~~the~~ TOOL03
Description:	Net calorific value of the fossil fuel type *f* consumed in the recycling facility in year *y*
Source of data:	-
Measurement procedures (if any):	As per the latest version of TOOL03. When applying the tool, requirements for $NCV_{i,y}$ should apply for the net calorific value of the fossil fuel consumed in the recycling facility
Monitoring frequency:	As per the latest version of TOOL03
QA/QC procedures:	As per the latest version of TOOL03
Any comment:	-

Data / Parameter table 12.

Data / Parameter:	$EF_{f,CO2}$; $EF_{BL,FF,CO2}$
Data unit:	As per latest version of ~~the~~ TOOL03
Description:	$EF_{f,CO2}$: CO_2 emission factor of the fossil fuel type *f* consumed at the recycling facility in year *y* $EF_{BL,FF,CO2}$: CO_2 emission factor of the baseline fossil fuel
Source of data:	-
Measurement procedures (if any):	As per the latest version of TOOL03. When applying the tool, requirements for $EF_{CO2,i,y}$ should apply for the CO_2 emission factor of the fossil fuel consumed at the recycling facility and for the CO_2 emission factor of the baseline fossil fuel
Monitoring frequency:	As per the latest version of TOOL03
QA/QC procedures:	As per the latest version of TOOL03
Any comment:	-

Data / Parameter table 13.

Data / Parameter:	$SFC_{f,i,PJ,y}$
Data unit:	unit mass/t or volume/t
Description:	Specific consumption of fuel type *f* of the processing facility, apportioned to material type *i* in year *y*
Source of data:	Records from the processing facility
Measurement procedures (if any):	Determined by dividing the quantity of material type *i* recycled in the processing facility ($Q_{i,y}$) by the fossil fuel type *f* consumed by the processing facility ($FC_{PJ,f,y}$). The monitoring provisions of the parameters $Q_{i,y}$ and $FC_{f,PJ,y}$ apply
Monitoring frequency:	The monitoring provisions of the parameters $Q_{i,y}$ and $FC_{f,PJ,y}$ apply
QA/QC procedures:	The monitoring provisions of the parameters $Q_{i,y}$ and $FC_{f,PJ,y}$ apply
Any comment:	The monitoring provisions of the parameters $Q_{i,y}$ and $FC_{f,PJ,y}$ apply

Data / Parameter table 14.

Data / Parameter:	**Municipal solid waste**
Data unit:	t/y
Description:	Quantity of municipal solid waste collected at the recycling facility
Source of data:	-
Measurement procedures (if any):	Quantity
Monitoring frequency:	Yearly
QA/QC procedures:	-
Any comment:	-

Data / Parameter table 15.

Data / Parameter:	$\$_{i,y}$ *and* $\$_{s,y}$
Data unit:	Local currency or USD
Description:	Sale price of plastic type *i* or material *s* in year *y*
Source of data:	-
Measurement procedures (if any):	Cross check with sale invoices/receipts
Monitoring frequency:	As per paragraph 42
QA/QC procedures:	-
Any comment:	-

Data / Parameter table 16.

Data / Parameter:	***Intrinsic Viscosity***
Data unit:	decilitres/gram (dL/g)
Description:	Intrinsic Viscosity of PET/PP
Source of data:	-

Measurement procedures (if any):	Test method for determining Intrinsic viscosity is as per ASTM D 4603 "Standard test method for determining Viscosity of Polyethylene Terephthalate" for PET and as per "Plastics - Determination of the viscosity of polymers in dilute solution using capillary viscometers; EN ISO 1628-3:2010)" for PP
Monitoring frequency:	Every batch of Polymerisation
QA/QC procedures:	-
Any comment:	-

6.2. Project activity under a programme of activities

47. Further guidance on leakage would be required to adapt this methodology for application to project activities under programme of activities.

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Document information

Version	*Date*	*Description*
09.0	13 July 2022	MP 88, Annex 18 To be considered by the Board at EB 115. Revision to include applicability conditions and default values of specific fuel consumption (SFC) and specific electricity consumption (SEC) for the recycling of polyvinylchloride (PVC).
08.0	9 September 2021	EB 111, Annex 8 Revision to ensure consistent methods in determining the emission factors associated with the consumption of fossil fuel and with the consumption of electricity in the production of virgin plastics.
07.0	31 August 2018	EB 100, Annex 7 Revision to update the default values.
06.0	4 May 2017	EB 94, Annex 10 Revision to broaden the applicability to cover recovery and recycling of metals (aluminium and steel) from waste collection systems.
05.2	12 August 2016	Editorial revision to correct the year in paragraph 11.
05.1	5 August 2016	Editorial revision to include information on mandatory and conditional sectoral scopes under section 2.4, paragraph 12.
05.0	22 July 2016	EB 90, Annex 14 Revision to broaden the applicability of container glass.
04.0	23 November 2012	EB 70, Annex 28 The revision includes inclusion of Polypropylene (PP).

Version	*Date*	*Description*
03.0	15 July 2011	EB 62, Annex 10 The revision includes: • Inclusion of accounting avoided methane emissions for recycling of paper and cardboard; • Inclusion of simplified requirements such as the use of default values for project emissions for the informal waste sector; and • Elimination of project emissions associated with energy use at processing/manufacturing facility.
02.0	18 February 2011	EB 59, Annex 3 Inclusion of Polyethylene Terephthalate (PET).
01.0	26 March 2010	EB 53, Annex 15 Initial adoption.

Decision Class: Regulatory
Document Type: Standard
Business Function: Methodology
Keywords: simplified methodologies, solid waste, type (iii) projects