METHODOLOGY ASSESSMENT REPORT FOR USE OF ALTERNATIVE MATERIALS TO DISPLACE THE PRODUCTION OF PLASTICS

Document Prepared by First Environment, Inc.

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Prepared By	First Environment, Inc.
Contact	10 Park Place, Building 1A, Suite 504 Butler, NJ 07405

	973-334-0003 www.firstenvironment.com
Approved By	James Wintergreen
Work Carried Out By	Michael Carim Jeff Daley Logan Simpson

Summary

The proposed methodology seeks to monitor and quantify emission reductions from the use of inorganic materials (alternative materials) in the production of intermediate plastic products. The use of alternative materials displaces petroleum-based intermediate products, resulting in a net reduction of life cycle GHG emissions associated with their use. The purpose of the assessment is to confirm the methodology's conformance with the VCS Methodology Requirements, v4.3.

The assessment was performed as a desk review. The criteria consisted of the VCS Methodology Requirements, v4.3. 34 findings were raised during the assessment. There are no uncertainties associated with the assessment.

Due to unresolved assessment findings, the assessment conclusion is that the proposed methodology is not in conformance with the assessment criteria and therefore is rejected.

CONTENTS

1 INTRODUCTION

1.1 Objective

The objective of the assessment is to reach a conclusion regarding the proposed methodology's conformance with Verra's requirements for new methodologies.

1.2 Summary Description of the Methodology

The methodology is applicable to the replacement of petroleum-based polymers with inorganic, alternative materials—such as calcium carbonate—in intermediate products used to manufacture plastics products. Final products made with alternative materials contain a lower quantity of petroleum-based polymers, which results in a net reduction of GHG emissions.

2 ASSESSMENT APPROACH

2.1 Method and Criteria

The following criteria were used for the assessment:

- VCS Methodology Requirements: VCS Version 4 Requirements Document, 17 January 2023, v4.3

The following steps were taken to perform the assessment:

- Kick-off meeting with Okeanos and Carbonomics to discuss objectives, scope, criteria, and timeframes,
- Development of assessment plan,
- Review and assessment of methodology element and relevant supporting documentation,
- Follow-up discussions with methodology developer to fill in data gaps,
- Corrective action cycle, and
- Reporting

2.2 Document Review

See Appendix B to this report for the list of documents were reviewed during the assessment process.

2.3 Interviews

Interviews with the following individuals were conducted throughout the assessment process:

- Seth Baruch, Carbonomics, LLC – Primary methodology author
- Conrick Gallagher, Okeanos Group LLC – Partnerships Director
- Madeline Armstrong, Okeanos Group LLC – Sustainability Partnerships Manager
- Florencio Cuétara, Okeanos Group LLC – Chief Executive Officer

2.4 Assessment Team

Team Leader – Michael Carim
Assessment Team – Jeff Daley, Logan Simpson
Independent Reviewer – James Wintergreen
VCS Program-approved standardized methods expert – Zach Eyler

2.5 Resolution of Findings

First Environment and VCS program-approved standardized methods expert issued several rounds of corrective action and clarification requests during the assessment process. Findings were presented to Carbonomics and Okeanos and several follow up discussions were held to provide clarification and answer questions regarding the findings issued.

A total of 23 corrective action requests and 11 clarification requests were raised during the assessment.

The main points of discussion with the methodology development team consisted of:

Applicability Conditions – Findings were raised with respect to whether the applicability conditions presented in the proposed methodology are consistent with the VCS methodology requirements. Specifically, several of the conditions laid down do not conform with the requirements because they cannot be evaluated at the project level during validation or impose ongoing monitoring requirements on Project Proponents. The methodology was revised to partially resolve the issues raised, however, applicability conditions remain that are inconsistent with VCS requirements.

Quantification methods – Findings were raised with the respect the internal consistency and algebraic accuracy of the equations presented for the quantification of baseline and project emissions. Errors were identified with unit conversions, GHGs quantified, and appropriateness of equations to intermediate versus final plastic products. Errors in the quantification methodology presented were partially resolved; however, inconsistencies in the units of measurement and the included GHGs remain.

Demonstration of equivalence – Findings were raised with respect to whether final plastic products manufactured using alternative materials are functionally equivalent to those made with traditional plastic polymers. The methodology attempts to address functional equivalence through the use of a density adjustment factor parameter in the quantification of baseline emissions, however, the methodology does not provide sufficient guidance regarding the monitoring of this parameter and fails to demonstrate how it achieves an "apples to apples" comparison of the quantity of conventional plastic and alternative materials used in useful/final products.

See Appendix A for detailed list of findings.

3 ASSESSMENT FINDINGS

3.1 Relationship to Approved or Pending Methodologies

The methodology developer identified following approved, similar methodologies:

Methodology	Reason for Exclusion
Approved VCS methodology - VM0040 - Greenhouse Gas Capture and Utilization in Plastic Materials	This methodology requires the use of CH_4 or CO_2 as the alternative material feedstock therefore cannot be revised to include other feedstocks. Additionally, the methodology is listed as inactive for the VCS programme on the Verra website.
Approved VCS methodology - VM0043 - Methodology for Utilization of CO2 in Concrete Production	The methodology provides precedent for the crediting of the displacement of upstream materials, however, the scope of the methodology does not include plastic materials and is focused on cementitious materials.
CDM Methodology -- AMS III A.J. -- Recovery and recycling of materials from E-Waste	The scope of the methodology does not include plastic materials and is focused on metals. Additionally, the methodology is listed as inactive for the VCS programme on the Verra website.

CDM Methodology -- AMS III B.A. -- Recovery and recycling of materials from E-Waste	The methodology provides precedent for the crediting of the displacement of upstream materials, however, the scope of the methodology does not include plastic materials and is focused on metals. Additionally, this methodology has been permanently excluded from the scope of the VCS programme.
CDM Methodology – ACM0005 -- Increasing the Blend in Cement Production	The methodology provides precedent for the crediting of the displacement of upstream material but is not applicable to plastic materials. Additionally, the methodology is listed as inactive for the VCS programme on the Verra website.

Based on First Environment review of the Verra website, the other methodologies identified above constitute an exhaustive list of extant methodologies. Based on further review of these methodologies and the restrictions placed on several of them, none could be reasonably revised to meet the objectives of the methodology developer, therefore the development of a new methodology is justified.

3.2 *Stakeholder Comments*

The project has been published by VERRA for public commenting and 53 stakeholder comments were received. Due to the high number of comments, please refer to Appendix C for list of comments and the methodology developer's responses. Based on the comments received the methodology has been updated; however, not all comments have been considered and provided with a sufficient response.

Due to similarities between comments received that mirror unresolved issues raised in the assessment team's findings or comments that do not appear to be adequately addressed by the methodology developer through revisions to the Methodology, the overall conclusion is that the methodology developer has not taken due account of all comments provided. Specifically, this conclusion is based on inadequate or incomplete responses to the public comments numbered 1, 10, 13, 25, 26, and 35.

3.3 Structure and Clarity of Methodology

The methodology is prepared using the VCS Methodology Template. All requirements related to the formatting and presentation of the methodology according to template requirements were followed; all information in the methodology is presented in the appropriate sections.

Terminology used to describe the methodology's components are consistent with the VCS programme and GHG emission reduction accounting, generally.

The terms "must", "should", and "may" are used throughout the methodology. While "must" and "may" are used appropriately to indicate requirements and optional measures, respectively, the term "should" is used throughout Section 9 of the methodology without consideration of whether it binds project proponents to the steps that follow its use. The methodology contains several monitoring or QA/QC steps that are introduced with "should" and it is unclear what procedures a project proponent would follow if the methodology's guidance is not.

While the methodology provides criteria and procedures for all components of a potential project activity, not all are written in a manner that facilitates their consistent application nor do all possess the ability to serve as unambiguous audit criteria. For example, the parameters WAP_i and WO_i used in the calculation of the Density Adjustment Factor are stated to be based upon "representative samples" of the useful/final product but the methodology does not adequately define what constitutes a representative sample. Similarly, the methodology does not consistently present methods for the quantification of baseline and project emissions in terms of alternative materials or useful/final products, instead blending the two throughout Section 8. As a result, it is unclear how to audit an individual project activity against the criteria laid out.

The overall structure and clarity of the methodology is therefore concluded to be insufficient.

3.4 Definitions

The methodology defines the following terms:

- Alternative materials
- Compounder
- Converter
- Conventional plastic/plastic materials
- Intermediary products
- Plastics markets
- Useful/final products

Terms are clearly defined and listed in alphabetical order in Section 3 of the methodology. However, terms are not used consistently throughout the Methodology. In particular, the terms intermediary products and useful/final products are used incongruously in some contexts. For example, Equation 1 is written in terms of intermediary products, however, the requirements for the parameter DAFi in Equation 1 are written in terms of useful/final products. The inconsistent use of the terms alternative materials, intermediary products, and useful/final products creates confusion in the methodology with regard to whether emission reduction monitoring and quantification is performed from the standpoint on intermediary products or useful/final products.
No key acronyms are used in the Methodology.

3.5 Applicability Conditions

The table below lists the applicability conditions from the methodology and the details of the conformity assessment performed:

#	Applicability Condition	Conformance Details
1	Production of an intermediary product that can displace one or more of the following conventional plastic materials: • Polypropylene (PP) • Polystyrene (PS) • Polyethylene (PE), including high-density and low-density polyethylene (HDPE, LDPE) and linear low-density polyethylene (LLDPE) • Thermoplastic polyurethane (TPU) • Acrylonitrile butadiene styrene (ABS) • Polycarbonate (PC) • Polyethylene terephthalate (PET) • Polyvinyl Chloride (PVC)	The applicability condition is appropriate for the project type and identifies the qualifying plastic materials that may be displaced in the baseline scenario. The condition is written in a sufficiently clear and precise manner such that conformance can be assessed at validation of a proposed project activity through confirmation of the conventional plastic material replaced in the project activity.
2	Project proponents shall indicate and keep records of which type of material listed above is being displaced by the output of the project activity (comprised partially or completely of the alternative material), because each material has a different emission factor (EF). Those records shall be provided to the verifier. If no specific displaced conventional plastic material is identified, the project would be ineligible to use this methodology.	The applicability condition is insufficient because it is not written in a way that allow easy determination of whether a potential project activity is eligible and furthermore implies ongoing monitoring obligations therefore cannot be assessed at validation at the project level.

3	The intermediary product containing alternative material produced by the project activity must have a lower EF than the conventional plastic product it is displacing. Alternative material content must exceed 40% by weight of the total product content of the final product. Project proponents must be able to obtain this data from the converter.	The applicability condition is appropriate for the project type and identifies the characteristics of eligible alternative materials, which can be confirmed at validation through product and material specifications. The condition is written in a clear and precise manner such that conformance can be assessed a validation of a proposed project activity through confirmation of the conventional plastic material replaced in the project activity.
4	The project proponent shall demonstrate, through sales records, that the intermediary product has been sold to a converter to produce final products.	The applicability condition is insufficient because it is not written in a way that allow easy determination of whether a potential project activity is eligible and furthermore implies ongoing monitoring obligations therefore cannot be assessed at validation at the project level.
5	Project activities must produce an intermediary product used to manufacture useful products that are sold in the commercial market.	The applicability condition is insufficient because it is not written in a way that allow easy determination of whether a potential project activity is eligible and furthermore implies ongoing monitoring obligations therefore cannot be assessed at validation at the project level.
6	The alternative material shall not biologically degrade over time and must therefore be inorganic.	The applicability condition is appropriate for the project type and identifies the characteristics of eligible alternative materials. The condition is written in a clear and precise manner such that conformance can be assessed a validation of a proposed project activity through confirmation of the conventional plastic material replaced in the project activity.
7	Data shall be available in the country where the project activity is taking place that indicate the amount or percentage of plastic material in the overall solid waste stream that is incinerated. Alternatively, a global default, as explained in Appendix II may be used.	Though the first part of this methodology condition is clear and would allow determination of project conformance, the second part is a quantification issue and therefore inappropriate for inclusion within this condition.

First Environment's overall conclusion is that applicability conditions #2, #4, and #5 are insufficient to meet the minimum requirements for new methodologies. Conditions #1, #3, #6, and #7 are written consistent with VCS requirements, however, alone are insufficient to

provide sufficient and comprehensive criteria for assessing the eligibility of potential project activities under the proposed methodology.

3.6 Project Boundary

The project boundary consists of the following GHG SSRs:

Source		Gas	Included?	Justification/Explanation
Baseline	GHGs from traditional production of plastic material, including upstream or raw material extraction emissions sources	CO_2	Yes	This is the primary emissions source in the baseline scenario displaced by the project activity.
		CH_4	Yes	
		N_2O	Yes	
		Other	N/A	Other GHGs (HFCs, PFCs, SF6) are not used in this process.
	Baseline production of intermediary products at the compounder and final products at the converter	CO_2	No	Emissions are excluded because intermediary and useful/final products are produced in both the baseline and project scenario. Exclusion is conservative.
		CH_4	No	
		N_2O	No	
		Other	N/A	
	Emissions from the incineration of plastic materials in the baseline	CO_2	No	Emissions from incineration in the baseline scenario are excluded. This is conservative.
		CH_4	No	
		N_2O	No	
		Other	N/A	
	Transportation of Plastic Materials	CO_2	No	Emissions are excluded from both the baseline and project scenario because project implementation does not
		CH_4	No	
		N_2O	No	

		Other	N/A	change the transport of materials downstream of the compounder.
Project	GHGs from the compounder	CO_2	Yes	Emissions from energy consumption add the compounder facility are included in the project scenario. CO_2 The methodology is not clear that this only includes the incremental increase in consumption at the compounder facility.
		CH_4	No	Excluded for simplicity
		N_2O	No	Excluded for simplicity
		Other	N/A	Other GHGs (HFCs, PFCs, SF6) are not used in this process.
	GHGs from incineration of alternative materials	CO_2	Yes	SSR is included as a source of emissions in the project scenario for end-of-life disposal of useful/final products containing alternative materials.
		CH_4	No	Excluded for simplicity
		N_2O	No	Excluded for simplicity
		Other	No	Other GHGs (HFCs, PFCs, SF6) are not used in this process.
	GHGs from the production of alternative materials, including upstream or raw material extraction emissions sources	CO_2	Yes	Main emissions source in the project scenario. Includes upstream and energy related emissions created in the production of the alternative material.
		CH_4	No	Excluded for simplicity This is not conservative and inconsistent with the GHGs included for the corresponding baseline emissions SSR.
		N_2O	No	Excluded for simplicity This is not conservative and inconsistent with the GHGs included for the corresponding baseline emissions SSR.

		Other	No	Other GHGs (HFCs, PFCs, SF6) are not used in this process.
	GHGs from the converter	CO_2	No	Emissions from the converter are excluded because they are assumed to be equal to the same emissions occurring in the baseline scenario, regardless of whether alternative materials are used.
		CH_4	No	
		N_2O	No	
		Other	No	Other GHGs (HFCs, PFCs, SF6) are not used in this process.
	Transportation of Plastic Materials	CO_2	No	Emissions are excluded from both the baseline and project scenario because project implementation does not change the transport of materials downstream of the compounder.
		CH_4	No	
		N_2O	No	
		Other	N/A	

The project boundary includes all relevant GHG SSRs for the baseline and project scenarios and is appropriate for the scope of the project activity covered by the Methodology.

Figure 1 in the Methodology identifies the relevant GHG SSRs and labels them as included or excluded in the baseline and project scenarios. However, Table 2 in the Methodology does not clarify how the individual SSRs identified in the Figure are linked to those identified in Table 2 and does not always use terminology consistent with Figure 1 in the description of SSRs.

Further, the GHGs identified as included or excluded in Table are inconsistent in cases with the quantification and monitoring methods laid out elsewhere in the methodology. For example, Table 2 indicates that CO_2 is the only relevant GHG for emissions from the compounder facility in the project scenario. However, Equation 6 for the quantification of Project emissions from the incremental increase in fossil fuel combustion at the compounder facility as a result of the project activity is expressed in terms of CO2e. Similarly, the data units specified for the parameter EF_a are given as “tCO2e” in Section 9.1 of the methodology.

Valid justification is not provided for the exclusion of CH_4 and N_2O emissions associated with the production of alternative materials. It is also noted that the exclusion of these gases in the project scenario is inconsistent with the selection of GHGs from traditional production of plastic material in the baseline scenario, where both GHGs are included.

All other relevant GHG emission sources have been identified, assessed and corresponding justification for inclusion or exclusion has been provided.

3.7 Baseline Scenario

The assessment team confirmed that the methodology utilizes a project method for the baseline scenario. However, the criteria and procedures to identify alternative baseline scenarios and then determine the most plausible scenario are not outlined sufficiently in the methodology.

The assessment team agrees with the methodology's assertion that the continuation of manufacturing intermediary and useful/final products through traditional processes is the likely baseline scenario. This assertion is supported with information provided in Appendix I.

Overall, the assessment team concludes that while it is likely that the baseline scenario is the continuation of plastic production using traditional methods, the methodology does not provide enough detail on the criteria and procedures to identify alternative baseline scenarios and determine the most plausible scenario.

3.8 Additionality

The assessment team confirmed that the methodology utilizes a combination of an activity method and a project method for additionality depending on whether calcium carbonate is used.

The assessment team confirmed that for both the activity and project method, the methodology requires projects to demonstrate regulatory surplus in Step 1 as required by the VCS Standard.

The assessment team confirmed the positive list developed for the activity method was appropriate for projects using calcium carbonate. The methodology used Option A: Activity Penetration (AP) and this analysis was outlined in Appendix I of the methodology.

To determine the Operational Activity (OA), the methodology developer conducted research into the current usage of calcium carbonate in plastics production. Using small amounts of calcium carbonate in production is fairly common, however the usage of high rates of calcium carbonate as a percentage of total product content (defined in the methodology applicability conditions as greater than 40%) is not common. Research conducted did not find relevant examples of high usage of calcium carbonate (outside of Okeanos) and a letter from the European Calcium Carbonate Association also supports this assertion. The assessment team agreed with the final value used for OA.

To determine the Maximum Adoption Potential (MAP), the methodology developer used available research on the total global plastics market and adjusted it downwards to account for market and other limitations. For example, based on current research there is an upward limitation of ~70% for the use of calcium carbonate in plastic. This limit was used to decrease the MAP. However, the final MAP proposed by the methodology developer was

not accepted as there were outstanding questions that were not addressed about further limitations on the use of calcium carbonate in the market.

Due to the MAP never being accepted and finalized, the final AP% could not be determined and approved by the assessment team. However, based upon the very low OA value, it is very likely that the final AP% would be below the required 5% threshold, regardless of the final MAP value.

Overall, the assessment team concludes that the positive list was developed appropriately, assuming the final AP% can be determined.

The assessment team reviewed the criteria and procedures for the project method used for projects that do not use calcium carbonate in production and confirmed that the methodology appropriately requires projects to use the most recent version of the *CDM Tool for the demonstration and assessment for additionality.*

3.9 Quantification of GHG Emission Reductions and Carbon Dioxide Removals

3.9.1 Baseline Emissions

Baseline emissions consist of the upstream emission associated with the production of traditional (petroleum-based) plastic materials. Baseline emissions are quantified separately for each plastic material displaced by the project activity using Equation 1. Emissions are quantified as the product of alternative material consumed by the project activity ($Q_{AM,i,y}$) by a dimensionless density adjustment factor (DAF_i) to equate this quantity into the amount of plastic material displaced. The amount displaced is multiplied by an emission factor (EF_i) that represents the upstream GHG emissions associated with the production of the conventional plastic material.

The density adjustment factor (DAF_i) is determined as the quotient of the “Weight in grams of a representative sample of the original final/useful product that used plastic material type I” (WO_i) by the “Weight in grams of a representative sample of the useful/final product made by the project activity, replacing plastic material type i" (WAP_i). The factor is necessary to account for differences in composition of useful/final products manufactured using different inputs.

The methodology provides country specific default emission factors for the parameter EF_i. The default factors are derived from US EPA WARM Model. The reference has been reviewed and the emission factors are found to be appropriately incorporated. While it was concluded that the use of emission factors from the WARM model are justified, it should be noted that the methodology does not reference factors from the most recently available data set.

The quantification approach for baseline emissions is appropriate for the project type and the equations presented adequately capture emissions for all relevant GHG SSRs as defined in Table 2 of the methodology. Baseline emissions from the production of intermediary and useful/final products, incineration of plastic materials, and transport of plastic materials are conservatively excluded from the project boundary therefore are not quantified in Section 8 of the methodology. Formulas are arithmetically correct and appropriate for the intended use. However, the audit team noted the following unresolved issues that prevent the rendering of an overall conclusion on the appropriateness of the quantification approach for the baseline scenario:

- It is unclear why 100% of the difference in mass between the final product manufactured in the baseline and project scenarios is assumed to be attributable to the difference in the quantity of petroleum- and alternative material-based polymers in intermediary products and the methodology developer has not provided any evidence to supporting this claim. Equation 2 in its current form does not sufficiently consider all potential factors influencing the weight of useful/final products in the baseline and project scenarios, therefore can cannot be concluded to adequately capture the adjustment factor for the quantity of plastic material between the baseline and project scenarios.
- Additionally, the boxes for the parameters WO_i and WAP_i in Section 9.2 state that these parameters are determined from the ratios of intermediary products, which contradicts the description of these parameters provided below Equation 2 in Section 8 of the methodology.
- Equations 1 and 2 are also missing subscripts to account for multiple final/useful products (i.e. “final product i" that potentially could be included in a single project activity.

3.9.2 Project Emissions

Project emissions are quantified using equation 3 and consist of the sum of:

- GHGs from the incineration of useful/final products containing intermediary products with alternative materials ($PE_{inc,y}$)
- GHG emissions from incremental increase in fossil fuel and electricity usage at the compounder facility ($PE_{elec,y}$ and $PE_{ffc,y}$)
- GHGs from the production of alternative materials, including upstream or raw material extraction emissions sources ($PE_{AM,Production,y}$)

Equation 4 describes the quantification of GHG emissions from incineration of useful/final products manufactured with alternative materials at their end-of-life. Emissions are quantified as the product of the quantity of alternative material produced by the project

activity ($Q_{AM,i,y}$) by material-specific CO_2 emission factor ($CO2_{released,i,y}$). A discount factor (DF_{EL}) is applied to the total quantity of incineration CO_2 calculated to reflect the overall quantity of plastic material that is incinerated at end-of-life in the project activity jurisdiction.

Equations 5 and 6 describe the quantification of GHG emissions from increases in energy consumption. Emissions are correctly quantified as the product of activity data by an emission factor.

Equation 7 describes the quantification of GHG emissions from the production of the alternative material used in the project activity.

Project emissions are quantified separately for each plastic material displaced by the project activity using Equation 7. Emissions are quantified as the product of alternative material consumed by the project activity ($Q_{AM,i,y}$) by an emission factor ($EF_{AM,i}$) that represents the upstream GHG emissions associated with the production of the conventional plastic material.

The quantification of project emission involves the use of four default factors.

DF_{EL} represents the fraction of plastic material in useful/final products that would be incinerated. For project activities in the United States, the value applied is equal to 15%. This is confirmed in the reference Documentation for Greenhouse Gas Emission and Energy Factors Used in the Waste Reduction Model (WARM): Organic Materials Chapters (November 2020) (U.S. Environmental Protection Agency (EPA), 2020. The reference has been reviewed and the emission factors are found to be appropriately incorporated. For project activities located outside the United States, country specific factors may be utilized if justified or alternatively a global default value of 40% is applied. This 40% default value is derived from a report from Plastic Europe citing European plastic incineration data. The methodology does not adequately justify why the global default value is applicable to facilities outside of Europe.

FC_a and EF_a are determined from IPCC Guidelines for National Greenhouse Gas Inventories according to the fuel type. This is an appropriate source for energy-based factors.

For project activities outside the United States, EF_{elec} is determined through application of the CDM '"Tool to calculate the emission factor for an electricity system." This use of the CDM Tool is appropriate to the methodology section. For project activities inside the Unites States, an appropriate regional emission factor for electricity emissions from the US EPA eGrid database is used. This is a recognized, publicly available data source in GHG accounting for this type of factor.

The parameter $EF_{AM,i}$ is determined from the results of a life-cycle analysis performed according to the requirements of International Standards Organization: ISO 14040:2006 or

ISO14044:2006. These are internationally recognized standards for the determination of product GHG emissions therefore are deemed sufficient.

The quantification approach for project emissions is appropriate for the project type and the equations presented adequately capture emissions for all relevant GHG SSRs as defined in Table 2 of the methodology. Formulas are arithmetically correct and appropriate for the intended use. However, the audit team noted the following unresolved issues that prevent the rendering of an overall conclusion on the appropriateness of the quantification approach for the project scenario emissions:

- It remains unclear how project emissions from energy use at the compounder facility will be determined. Quantification methodologies are not presented on a per unit basis and instead rely on the "incremental increase" in energy use, however, no criteria are specified to determine the incremental usage. The methodology does not provide any monitoring procedure to determine the incremental quantity of energy use associated with the production of alternative materials.
- Equation 6 ($PE_{ffc,y}$) and the emission factor for EF_a is expressed in terms of CO2e, however, Table 2 in Section 4 suggests CO_2 is the only included GHG for this emission source.

3.9.3 Leakage Emissions

The methodology does not provide an examination of potential sources of leakage emissions and consequently does not provide any procedure of the quantification of any such emissions. Two emissions sources are mentioned in Section 8.3, but both are included within the project boundary, therefore by definition are not sources of leakage emissions.

Furthermore, the methodology does not explain how it would achieve the demonstration of equivalence between the useful/final product made from conventional plastics versus that made from alternative materials. As such, potential sources of leakage emissions remain unexamined. For example, if a useful/final product made from alternative materials has a shorter lifespan than one made from conventional plastics, this scenario could result in an increase in overall GHG emissions beyond those currently accounted for under the scope of the methodology.

The overall conclusion is that leakage emissions have not been adequately contemplated by the Methodology developer.

3.9.4 GHG Emission Reductions and Carbon Dioxide Removals

Overall GHG emission reductions are correctly quantified in Equation 8 in the methodology as the difference between total baseline emissions and total project emissions. Relative to

the baseline and project scenario conventional plastic and alternative materials, the baseline emissions are expressed in terms of CO_2e, however project emissions are expressed in terms of CO_2 only. This is not conservative therefore the quantification of total emission reductions presented in the methodology is not appropriate.

Furthermore, the methodology contains confusion with regard to the overall unit of analysis in the monitoring and quantification of emission reductions. The methodology summary in Section 2 suggests that project activities are focused on the production of intermediary products, which contain alternative materials. However, monitoring and quantification methodologies reference alternative materials and useful/final products. As such, it is not clear that the overall emission reduction quantification approach reflects the stated project activity.

3.10 Monitoring, Data and Parameters

Sections 9.1 and 9.2 present the data and parameters available at validation and data and parameters monitored, respectively. Collectively, the parameters not monitored and monitored comprise all variables and inputs needed for the quantification of emission reductions according to the equations presented in Section 8 of the Methodology. However, some parameters contain deficiencies that prevent the current monitoring plan from adequately providing sufficient guidance at the project level and the necessary clarity required for validation/verification under the methodology. The table below presents the data/parameters available at validation and the data/parameters monitored and the corresponding assessment conclusions regarding each.

Parameter	Description	Assessment Conclusion
EF_i	Emission factor for GHGs caused by the production of plastic materials in tCO2/metric tonne of plastic material	For U.S.-based projects, the data source and values applied are the US EPA Warm Model, as detailed in Appendix II to Methodology. This model is appropriate for the parameter; however, the methodology developer does not employ the most current data available from the resource. For projects located outside the US, data from a credible international or national agency is to be used. The methodology vaguely references other potential data sources for non-US projects but does not identify them with sufficient detail.

		The parameter is determined once at validation for the quantification of baseline emissions. This parameter is an example of inconsistent data units in the methodology. Equation 1 identifies the units as tCO2e (as suggested by the Table 2 Project Boundary) but the parameter box identifies the data unit as "tCO2/metric tonne of plastic material type i produced".
DF_{EL}	Discount factor applied to account for the end of life of plastic material that is incinerated, releasing CO2	For U.S.-based projects, the data source for the dimensionless parameter is the US EPA waste management statistics. This dis a reasonable data source for the parameter. For projects located outside the US, data from a credible national agency is to be used or a global default value of 0.40 is applied. The global default is derived from report from Plastic Europe citing European plastic incineration data and conservatively determined based on the highest international incineration rate observed. The parameter is determined once at validation for the quantification of project emissions and the data unit for the parameter is consistent with quantification methods provided.
$CO2_{released,i,y}$	Amount of CO2 released when one metric tonne of alternative material is incinerated in year y.	Parameter is determined for the quantification of project emissions from the carbon content of the alternative material and stoichiometric ratio of the alternative material to CO_2. This is method is appropriate for the intended use. The parameter is determined once at validation for the quantification of project emissions and the data unit for the parameter is consistent with project emissions quantification methods provided.
EF_a	Emission factor of fuel type a	Appropriate emission factor is determined at validation from

		IPCC records based on the fuel type. This method is appropriate for the intended use. The parameter is determined once at validation for the quantification of project emissions. The data unit for the parameter (tCO_2e) is consistent with project emissions quantification methods provided in Equation 6; however, is not consistent with description of included GHGs (CO_2 only) for the relevant emissions source in Table 2 for the Project Boundary or the data units used in Equation 3.
FC_a	Energy content per unit of fuel type a	Appropriate factor is determined at validation from IPCC records based on the fuel type. This method is appropriate for the intended use. The parameter is determined once at validation for the quantification of project emissions and the data unit for the parameter is consistent with project emissions quantification methods provided.
EF_{AM}	Emission factor for producing one tonne of alternative material.	The data source and value applied are determined from a life-cycle analysis (LCA) of the alternative material used in the project activity. LCA is required to be performed to ISO 14040:2006 and ISO14044:2006, both of which are recognized standards for evaluation of the monitored parameter. This method is appropriate for the intended use. The parameter is determined once at validation for the quantification of project emissions and the data unit for the parameter is consistent with project emissions quantification methods provided.
$Q_{AM,i,y}$	Quantity of alternative material displacing conventional plastic type i in intermediary products produced by the project	The methodology adequately describes the parameter and the equipment and QA/QC procedures for instruments used to monitor the quantity of alternative material produced. The parameter is measured for the quantification of baseline and

		project emissions and the data unit for the parameter is consistent with quantification methods provided. The description of measurement methods for the monitored parameter also include monitoring requirements relative to useful/final products that are unrelated to $Q_{AM,i,y}$ and emissions quantification. The stated purpose of these requirements is to establish conformance with various Applicability Conditions. This is inconsistent with VCS Methodology requirements.
WO_i	Weight in grams of a representative sample of the displaced conventional plastic type i	The parameter box identifies "Weight in grams of a representative sample of the displaced conventional plastic" which is inconsistent with Equation 2 description identifying "Weight in grams of a representative sample of the original final/useful product that used plastic material". The methodology specifies that a representative sample consists of a single unit of the useful/final product, it does not provide any justification as to why this unit of analysis is appropriate for the intended use of the monitored parameter. Additionally, the parameter does not consider whether other changes to the weight of the useful/final product may occur as the result of the utilization of alternative materials.
WAP_i	Weight in grams of a representative sample of the alternative product in the intermediary product that displaces a conventional plastic type i	The parameter box identifies "Weight in grams of a representative sample of the alternative product in the intermediary product that displaces a conventional plastic" which is inconsistent with Equation 2 description identifying "Weight in grams of a representative sample of the

		useful/final product made by the project activity, replacing plastic material". The methodology specifies that a representative sample consists of a single unit of the useful/final product, it does not provide any justification as to why this unit of analysis is appropriate for the intended use of the monitored parameter. Additionally, the parameter does not consider whether other changes to the weight of the useful/final product may occur as the result of the utilization of alternative materials.
$Q_{elec,y}$	Incremental increase in electricity used by the compounder as a result of the project activity and supplied by the grid in year y	The methodology adequately describes the parameter and the equipment and QA/QC procedures for instruments used to monitor electricity. The parameter is measured for the quantification of project emissions and the data unit for the parameter is consistent with project emissions quantification methods provided. However, the methodology does not describe any procedure to determine the *incremental* electricity usage attributable to the project activity, which is required for emissions reduction quantification.
EF_{elec}	Emission intensity of electricity	The methodology adequately describes the parameter and the measurement procedure used to determine its value. For project activities in the US, a location-specific emission factor from the US EPA eGrid database is used. For projects outside the US, the CDM *'Tool to calculate the emission factor for an electricity system'* is used. Both are appropriate choices relative to the purpose of the data. The parameter is measured for the quantification of project emissions and the data unit for the parameter is consistent with project emissions quantification

		methods provided. However, the QA/QC procedure described in the methodology is ambiguous and appears to describe the applicable measurement methodologies instead.
$Q_{FF,y}$	Incremental increase in fossil fuel used by the compounder as a result of the project activity in year y	The methodology adequately describes the parameter and the equipment and QA/QC procedures for instruments used to monitor fossil fuel consumption. The parameter is measured for the quantification of project emissions and the data unit for the parameter is consistent with project emissions quantification methods provided. However, the methodology does not describe any procedure to determine the *incremental* fuel usage attributable to the project activity, which is required for emissions reduction quantification.

3.11 Uncertainty

The methodology does not identify any potential sources of uncertainty. The nature of the parameters determined under the methodology are such that material differences between the observed (measured) and actual amounts are unlikely to occur.

3.12 Verifiable

First Environment has concluded that the current version of the methodology is not sufficiently clear and specific to facility project activities that can pass validation and verification with high confidence. In particular, the following significant items prevent effective implementation of the methodology at the project-level:

- Applicability conditions #2, #4, and #5 are not able to be assessed at validation due forward-looking requirements that require assessment during project implementation or impose ongoing monitoring requirements on the project proponent.
- The methodology does not adequately specify how to determine what constitutes a representative sample for the determination of the parameter DAF_i and how the use of alternative plastic materials may alter the weight of the useful/final product made from the alternative material, thereby affecting the quantification of baseline emissions and potential leakage emissions.

- The methodology is not internally consistent with respect to whether emission reductions are quantified on the basis of intermediary products or final products (as defined by the methodology) and the GHGs accounted for in both the baseline and project scenarios
- The quantification method presented in Section 8 of the methodology contains inconsistencies in units of measurement with respect to individual GHGs

The methodology must present a clear approach for project design and implementation that shows how an activity that reduces GHG emissions meets the VCS definition of a project activity. In its current form, the methodology is still unclear or too vague with respect to the characteristics of a qualifying project activity, therefore cannot provide the necessary specificity to potential project developers required to transparently report project results that can pass validation and verification with a high degree of confidence.

4 ASSESSMENT CONCLUSION

Based on the assessments performed, First Environment cannot conclude with a reasonable level of assurance that the current methodology version number "2" dated "September 2022" complies with the assessment criteria. Therefore the proposed methodology is rejected.

5 EVIDENCE OF FULFILMENT OF VVB ELIGIBILITY REQUIREMENTS

The Methodology falls under VCS Sectoral Scope 3. First Environment is eligible to perform validations and verifications in Sectoral Scope 3. See:

https://verra.org/validation-verification/first-environment-inc/

6 SIGNATURE

Signed for and on behalf of:

Name of entity: _____First Environment, Inc._____

Signature:  _____

Name of signatory: _____Michael Carim_____

Date: _____23-March-2024_____

APPENDIX A: RESOLUTION OF FINDINGS

ID	Corrective Action Request	Summary of Participant Response	Assessment Conclusion
1	The following sections of the Methodology do not completely address or contain inconsistencies with the requirements of the VCS Methodology Element template: · 'Relationship to Approved or Pending Methodologies' section is missing the language included above Table 1 in the template · Section 1/Sources does not include reference to the CDM Additionality Tool or the Tool to calculate the emission factor for an electricity system · Appendix 1 (Activity Method) neither follows the format nor contains the required subsections of the template	The 'Relationship to Approved of Pending Methodologies' and 'Sources' sections of the methodology were revised to follow template instructions. Appendix I has not been revised.	Issue is partially resolved. Request made relative to Appendix I remains open.
2	It has not been demonstrated what action has been taken to take due account of public comments received (i.e. update the methodology or demonstrate the insignificance or irrelevance of the comment).	The methodology developer provided partial responses to public comments received.	Responses to public comments are incomplete and do not address all questions raised. See assessment conclusion provided in Section 3.2 above.
3	The procedures to determine the parameters WO_i/WAP_i and EF_{AM} neither provide a sufficient level of detail for monitoring plan implementation nor do they identify criteria that the project-specific factors must satisfy.	For the parameter $EF_{AM,}$ the methodology was revised to specify that a life cycle analysis performed to ISO 14040:2006 and ISO14044:2006 standards will be used to determine the value of the parameter.	Issue is partially resolved. Request made relative to parameters WO_i and WAP_i remains open as sufficient procedures have not been provided.
4	In Section 5 of the Methodology: · the description of the spatial extent of project boundary omits baseline emissions associated with raw material extraction and project emissions associated with incineration of plastics at end of life. · In Table 2 the baseline emission source is incorrectly described as the displacement of traditional plastics production, which	The spatial extent of the project boundaries were revised to include both baseline emissions from raw material extraction and project emissions from alternative material incineration at product end-of-life. The description of the baseline emissions source in Table 2 was revised to remove the inaccuracy.	Response is acceptable. However, the overall issue regarding the relation of the GHG SSRs identified in Table 2 and the quantification equations presented in Section 8 remain open. See Assessment Conclusion for Issue #14 below.

ID	Corrective Action Request	Summary of Participant Response	Assessment Conclusion
	corresponds to the project action in the project scenario · Table 2 does not include any upstream or raw material extraction emissions sources for traditional or alternative plastic materials in any of the SSRs identified See Issue #14 below as well.	Table 2 was revised to include upstream emissions including raw material extraction for both the baseline and project scenarios.	
5	Section 4 of the methodology does not distinguish which applicability conditions apply to all project activities under the methodology versus those that serve as the positive list for project activities using calcium carbonate as the alternative material.	The methodology developer proposed revisions Section 4 in its response that would require the use of the CDM Tool to Demonstrate Additionality in addition to satisfying the requirements of the positive list for project activities using a different alternative material than calcium carbonate. However, the revision was not incorporated into the revised methodology.	Proposed response is acceptable; however, no change was made to the methodology document therefore the issue remains open.
6	The $Q_{AM,y}$ parameter in equation 1 is missing the subscript i denoting plastic type *i*	The affected parameter in Equation 1 was updated in the methodology to include the appropriate subscript for plastic type *i.*	Response is acceptable.
7	The unit of measurement defined for the parameter $R_{CO2released,y}$ in both Equation 4 and the monitoring box in Section 9.1 are incorrect. As written, the equation does not compute to a result expressed in tCO_2e due to data unit issues referenced above.	The unit of measurement for the parameter $R_{CO2released,y}$ was revised to tonne CO_2 per tonne of alternative material in both equation 4 and the associated monitoring box in Section 9.1. The revision from a unitless parameter to the ratio expressed in the revised data unit corrects the algebraic inconsistencies in Equation 4.	Response is acceptable.
8	The monitoring box for the parameter $R_{CO2released,y}$ and Footnote 6 to Equation 4 provides incorrect guidance regarding the determination of the conversion factor because it does not consider the molar masses of $CaCO_3$ and CO_2 or the stoichiometric ratio of reactants and products in the chemical reaction.	The monitoring parameter was renamed $CO_{2,released,y}$ in the revised methodology. The monitoring box for the parameter was revised to use the correct ratio for the complete calcination of $CaCO_3$ to CO_2 and provide correct guidance for use at the project level.	Response is acceptable.

ID	Corrective Action Request	Summary of Participant Response	Assessment Conclusion
		The footnote to Equation 4 was revised to reference the monitoring box for the parameter in Section 9.1.	
9	Equation 6 and the description of its inputs contain the following errors: · The parameter $Q_{FF,y}$ is missing a subscript for the fuel type. · The equation is missing a summation function over the appropriate index (i.e. fuel type a) · The unit of measurement specified for FCa in the text below the equation is incorrect.	Revisions to the methodology at Equation 6 include · Addition of a subscript (a) to the parameter to indicate the fuel type used · Addition of the summation command to aggregate emissions over all fuel types · The unit of measurement specified for FC_a in Equation 6 was revised from TJ to TJ per unit of fuel	Response is acceptable.
10	The monitoring box for the parameter DF_{EL} references an incorrect Equation number.	The monitoring box for the parameter was revised to reference Equation 4.	Response is acceptable.
11	In Section 9.1, the monitoring boxes for the parameters EF_a and FC_a, the entries in the Data unit and Description rows appear to be switched between the two parameters. Additionally, the entries in the row for the 'Justification of choice of data or description of measurement methods and procedures applied' are not valid given the attributes and purposes of these parameters.	The data unit and description rows for EF_a and FC_a, were revised to resolved the inconsistency. The justification for the selection of the values applied were revised to be consistent with the data source employed (IPCC).	Original issues are closed, however, the data units identified in Section 9.1 for EF_a are inconsistent with the GHGs identified for the associated project scenario emission source from Table 2 of the methodology.
12	Purpose of data in the monitoring boxes for $Q_{elec,y}$ in Section 9.2 is incorrect	The entry in the purpose of data row in the monitoring parameter box was revised to identify project emissions as the purpose.	Response is acceptable.
13	The text below the Baseline Scenario in Figure 1 describes "less conventional plastics produced and shipped to the market," however, this description would refer to the project scenario.	Figure 1 was revised to remove the text in question.	Response is acceptable.
14	The relationship between the GHG SSRs identified in Section 5 and the emissions sources quantified in Section 8 could be more consistent, particularly with regard to the names and descriptions	The GHG SSRs in Section 5 and Table 2 of the Methodology were revised for consistency with all GHG emission sources quantified in Section 8.1 and 8.2 of the Methodology.	Revisions made to the methodology facilitate adequate comparison between Sections 5 and 8. However, inconsistencies remain between the GHG included in Section 5 and the emissions of individual GHGs quantified through the equations

ID	Corrective Action Request	Summary of Participant Response	Assessment Conclusion
			presented in Section 8. Therefore, issue remains open.
15	In Section 8.2, footnote 5 identifies natural degradation of alternative materials as a potential source of project emissions but the methodology does not provide any guidance for quantification of these emissions.	The project proponent has decided to limit the methodology to inorganic alternative materials only, so there is no risk of decomposition or emissions of methane at end-of-life. On App. Condition #5, I added "...and must therefore be inorganic". Changes also made in Section 8.	Response is acceptable.
16	The discussion of potential sources of leakage in Section 8.3 is insufficient to establish criteria and/or procedures for identifying potential sources of leakage, particularly with regard to activity-shifting leakage, and includes discussion of emissions sources that are already included within the project boundary.	No material changes have been made to the discussion of potential sources of leakage in Section 8.3 of the methodology	The issue remains open. The methodology developer has suggested that the approach to leakage from VM0040 be adopted here, however, this is insufficient reasoning given the differences in scope of the methodologies.
17	Where an alternative plastic material displaces multiple conventional plastic materials in a useful product, the Methodology does not provide a procedure in the quantification of emissions to apportion the substitute material between various traditional plastics in the Useful Product in the baseline scenario.	In cases where the precise type of plastic displacement cannot be identified -- or where there are potentially multiple plastic types in a useful product -- the PP would propose simply using the most conservative option as a default. A note was added to the EF parameter in Equation 1 and the relevant monitoring table.	Response is acceptable. This is conservative.
18	Please provide every document noted as a source in Appendix I - many documents are behind a paywall or the links do not work.	All relevant references have been provided to the assessment team.	Response is acceptable.
19	Not all references cited in footnotes are noted in References section.	The list of references in the methodology has not been updated to account for the finding raised.	The issue remains open. The methodology developer did not finalize a response.
20	Please expand and provide more detail on how the factors that could limit adoption of a project activity are considered as required in section 3.5.9 (1)(a)(i-vii) of the Methodology Requirements document.	Responses to some questions were acceptable, but not all questions were answered.	Responses to some questions were acceptable, but not all questions were answered.

ID	Corrective Action Request	Summary of Participant Response	Assessment Conclusion
21	Please provide information for section 3.5.9 (1)(c) of the Methodology Requirements.	This technology has been available for more than three years.	Response is acceptable.
22	What is the final AP, OA and MAP? Multiple calculations are presented.	The methodology provided an updated calculation.	The issue remains open. The methodology developer did not provide calculations and evidence to support a final value for AP and MAP.
23	The methodology does not use the term plastic substitutes consistently. In some context, the methodology uses this term to refer to polymers made from alternative materials while in others it refers to the final product(s) made from these polymers. See for example: • Section 3: Definition of Plastic substitutes • Section 4: Applicability condition #2 • Section 5: Project Boundary, second bullet • Section 8.2: Description of project emission sources	The methodology was revised to largely remove the use of the term “plastic substitutes” and instead refer to intermediary products and useful/final products, except for two references in the conclusion of Appendix I.	Response is acceptable; however, issue remains open on account of lingering references to “plastic substitutes.” Additionally, inconsistencies in the use of replacement terminology remain. See discussion provided in Section 3.4 above.

ID	Clarification Request	Summary of Participant Response	Assessment Conclusion
1	The definition provided for Plastic Substitutes states that they will "have the same functions as conventional plastic." Please clarify whether a project proponent is required to provide any demonstration of equivalence and, if so, what procedures would be applied to do so.	Responses provided included revision to the methodology related to sales records that demonstrate the use of the intermediary product in a final/useful product.	The methodology developer has not provided adequate guidance in the methodology to ensure that useful/final products will fulfill the same function as products manufactured with traditional plastic materials. Sales records alone do not provide adequate demonstration of equivalence between traditional and alternative plastic materials. The methodology developer additionally posits that the density adjustment factor (DAF) applied

ID	Clarification Request	Summary of Participant Response	Assessment Conclusion
			in Equation 1 for the quantification of baseline emissions accounts for the differences between useful/final products produced in the baseline and project scenarios. However, the methodology does not provide any guidance on the determination of a representative sample required in the factor. Furthermore, the methodology does not contemplate the potential lack of equivalence between the baseline and project scenarios, i.e. that useful/final products manufactured with alternative materials do not last as long, perform as well, or otherwise are not comparable to similar products made with traditional plastic materials. Issue remains open.
2	Relative to the definition of Useful Products and Applicability Condition #1, please confirm whether the scope of the methodology applies only to finished goods and products or if it is also relevant to the production of intermediary products and plastic polymer substitutes upstream of their incorporation into final goods and products.	The methodology developer confirmed that the methodology applies fundamentally in the intermediary process where the plastic is replaced by alternative materials and revised the methodology to specify that the Project Proponent is responsible for identifying the plastic polymer displaced by the project activity.	Response is acceptable. Revisions to methodology applicability conditions effectively resolves the clarification request.
3	Regarding Applicability Condition #2, please clarify whether the methodology is applicable in the case of an alternative plastic material replacing multiple traditional plastic materials in a single Useful Product.	A conventional plastic product may include two or more different types of plastic and/or paper and metal	Clarification request is closed, however, see Corrective Action Request #17 for follow on issue.
4	For the Monitored Parameters WOi and WAPi, please clarify what constitutes a representative sample.	A representative sample WO is the commercial sample in the market place. WAP is the commercial ready sample of the substitute material. A sample that is mass produced and mass sold in market. A sample would be no different than what goes into market.	Response is insufficient to provide guidance or definition as to what constitutes a representative sample. The density adjustment factor is not defined in terms of intermediary products, but rather final products, therefore the possibility for manipulation of the value remains.

ID	Clarification Request	Summary of Participant Response	Assessment Conclusion
5	Please confirm the degree of uncertainty associated with the estimation of the monitored parameter EF_{AM} and describe mitigation procedures for any such uncertainty, as applicable.	The monitoring requirements for the parameter EF_{AM} were revised to require the use of either ISO14040 or ISO14044 for the life cycle analysis performed to determine the value of the parameter.	Response is acceptable. The referenced ISO standards contain procedure for performing uncertainty analysis in the LCA, therefore the requirement is satisfied.
6	Please clarify how the applicability condition that the project activity will cause no greater negative social impact than the production and use of conventional petroleum-based plastics can be assessed at project validation.	The applicability condition was removed from the methodology because the VCS Standard and Project Description template already incorporate requirements for the assessment of environmental and social impacts at the project level.	Response is acceptable.
7	Should one company be mentioned in Appendix I (Okeanos)? There is no reference to them earlier and seems out of context.	The methodology developer demonstrated precedent for specific references to the methodology developer in other Verra-approved methodologies.	Response is acceptable.
8	If PCC is the only CaCO3 that will be used, should this be part of applicability conditions?	The methodology shouldn't be limited to PCC but include FGCC and GCC, therefore considering all types of CaCO3 used in packaging. In fact, Okeanos currently uses only GCC CaCo3. Due to limited publicly available information on CaCO3 in packaging we included information on PCC in some of our calculations.	Response is acceptable.
9	The Methodology states: "CaCO3, is ubiquitous, and there are no particular barriers that would limit the adoption of this technology, which can displace just about any plastic product." Are there limitations to the plastic end products that can be produced with CaCO3? Are there limitations for PCC? Activity penetration % is calculated for packaging in one instance - is CaCO3/PCC only usable for those end products?	Calcium carbonate can replace a vast array of plastic items in the market place from single use products to multi-use long life products. Our highly loaded Calcium Carbonate compounds can be used for blown molding, thermoforming, injection, blown film, which allows for the production of materials that are not limited to only packaging (examples of non packaging: agricultural film, jerry cans, hangers, buckets, toys, tooth brushes). Limitations of using Calcium carbonate would be: 1) Cannot be made fully transparent... more of an opaque look, 2) Acidity can be an issue, pH of anything less than 4.5	Response is acceptable.

ID	Clarification Request	Summary of Participant Response	Assessment Conclusion
		could pose an issue to the integrity of the packaging. (Ex: packaging of an acidic material).	
10	Are there other companies using alternative materials for plastics production generally? Are there other companies using CaCO3?	To our knowledge there are a few companies using CaCO3 in higher than the industry average (If CaCo3 is included in finished products, you would usually find around 5-10% max). However, apart from Okeanos there are no known companies that are able to produce functional products using CaCo3 at 50% or higher in the finished good.	Response is acceptable.
11	Should the geographic scope be limited to determine the AP%? There could be high variability across countries and regions and data for certain areas is limited.	The scope was determined to be global in nature.	Response is acceptable.

APPENDIX B: DOCUMENTS REVIEWED

- Calculation Spreadsheet: 'Calculations for Okeanos.xlsx'
- Calculation Spreadsheet: 'Global CaCO3 to Plastic under 5 perc.xlsx'
- City of Winnipeg (2012). *Emission Factors in kg CO2-Equivalent per Unit.* Available at: https://www.winnipeg.ca/finance/findata/matmgt/documents/2012/682-2012/682-2012_Appendix_H-WSTP_South_End_Plant_Process_Selection_Report/Appendix%207.pdf
- Department for Environment Food & Rural Affairs (2020). *UK Statistics on Waste.* Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/918270/UK_Statistics_on_Waste_statistical_notice_March_2020_accessible_FINAL_updated_size_12.pdf
- Government of India Ministry of Chemicals & Fertilizers (2021). *Annual Report.* Available at: https://chemicals.nic.in/sites/default/files/Annual_Report_2021.pdf
- Ministry of Economy, Trade and Industry (2021). *Yearbook of Current Production Statistics: Paper, Printing, Plastic Products and Rubber Products.* Available at: https://www.meti.go.jp/english/statistics/tyo/seidou/index.html
- Office for National Statistics (2020). *UK Manufacturers' Sales by Product Survey.* Available at: https://www.ons.gov.uk/businessindustryandtrade/manufacturingandproductionindustry/datasets/ukmanufacturerssalesbyproductprodcom
- Plastics Europe (2015). *Plastics–The Facts 2014: An Analysis of European Plastics Production, Demand and Waste Data.* Available at: https://www.plasticseurope.org/application/files/5515/1689/9220/2014plastics_the_facts_PubFeb2015.pdf
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- U.S. Environmental Protection Agency (2016). *Advancing Sustainable Materials Management: 2014 Fact Sheet Assessing Trends in Material Generation, Recycling, Composting, Combustion with Energy Recovery and Landfilling in the United States.* Available at: https://www.epa.gov/sites/production/files/2016-11/documents/2014_smmfactsheet_508.pdf
- Nurettin Sezer, *Production of Precipitated Calcium Carbonate from Marble Waste*, 2013.
- *Ground & Precipitated Calcium Carbonate: Global Industry Markets & Outlook*, 1st edition 2012, from http://www.roskill.com/reports/industrial-minerals/ground-and- precipitated-calcium-carbonate-1
- Roskill: *An overview of the North American calcium carbonate market*
- Blitz Co. *Precipitated Calcium Carbonate*, (https://blitzco.de/)

APPENDIX C - Stakeholder Comments

Comment #	Comment	Proposed Change	Developer Response	FE Conclusion	PP Response	FE Conclusion	PP Response
1	1) The methodology is applicable to project activities that use alternative materials for the production of useful products – these products could include anything that would, in the baseline scenario, be made from conventional plastics. These useful products, defined as "products that have a commercial use and are bought by customers who intend to use the products", are sold in the commercial market and the proponents must specify what products are being sold in the market and demonstrate to the auditor that the products have in fact been sold. A first reader may understand that "useful products" could be defined as "final products", meaning that the proponent should specify to the VVB that the alternative materials are being used to produce plastic bottles, plastic cutlery, plastic bags, etc that are sold in the market. However, another reader may understand that "useful products" represent the "primary products" (plastic pellets), meaning that the proponent should specify to the VVB that the alternative materials are being used to produce plastic resin or pellets that are sold in the market. The understanding of each of these two readers has an impact in the project boundary: - if "useful products" = "final products", the project boundary should be expanded to include the facility that produces the final product; - if "useful products" = "primary products", the project boundary can remain as it is; 2) The methodology does not contain provisions to secure that the properties of the plastic produced by the project have the same properties of the plastics produced in the absence of the project using petroleum products, which may impact the calculation of emission reductions. For example, if the quality of the plastic produced by the project is lower than the quality of the plastic produced using petroleum products, the final product may need to be replaced more frequently.	1) Elaborate the definition of "useful products" and revise the project boundary, the application of the methodology and the calculation of emission reductions as appropriate. 2) Include provisions to secure that the plastic produced by the project has at least the same quality of the plastic produced using petroleum products by means of undertaking laboratory tests (e.g. chemical, mechanical and other performance tests).	The methodology can be applicable to final products. As well as "intermediary" feedstocks to final products. Appropriate changes have been made in the methodology document. Statements have also been put into the methodology around ensuring the final products are of equal quality.	Confirm whether methodology is intended for intermediary or final products. If it includes final products, methodology still needs to address part 2 of the comment as changes in the methodology do not appear to include elaboration of the definition of useful products.	With regard to #2, this may be a challenge to demonstrate in all cases. For example, a CaCO3-containing yogurt cup that holds the same amount of yogurt as the virgin plastic cup may have better barrier or puncture resistance but worse tear resistance. We believe the key factor is if it is acceptable to the yogurt company (in this case). Again, if the material is being used to make a useful product -- and that can be demonstrated to the verifier -- then that is tantamount to functional equivalence. If the product didn't meet a particular code or was of poor quality, then during a monitoring period, one would presume much of that product has not been sold. Again, functional equivalence is harder to demonstrate in a consumer product compared to concrete (VM0043 has a functional equivalence test because of safety reasons).	Responses do not clarify how the methodology addresses potential impacts to emissions calculations. A fork may be a fork, but if the fork made from alternative material doesn't last as long then functional equivalence can't be determined on this basis alone. It's no longer a 1-to-1 comparison of the two forks' emissions profiles if the one made from alternative material has to be replaced more (or less) frequently. The methodology does not contain provisions to secure that the properties of the plastic produced by the project have the same properties of the plastics produced in the absence of the project using petroleum products, which may impact the calculation of emission reductions. For example, if the quality of the plastic produced by the project is lower than the quality of the plastic produced using petroleum products, the final product may need to be replaced more frequently. See Corrective Action #16 as well. This is a potential source of leakage that could be addressed in Section 8.3.	After much consideration, we cannot find another way to demonstrate functional equivalence other than to have confirmation from the PP's customer, in the case of Okeanos, the final product manufacturer. However, just by the fact that the customer is buying the product (and will continue to buy the product -- otherwise, no carbon credits would be generated) should be enough to demonstrate this. For single use products, this would not be an issue. For multi-use products, no final product manufacturer would continue to sell a product that doesn't last as long. So we don't believe this should be an issue. However, we did add some phrasing in the following applicability criterion that specifically mentions quality: "In the case of an intermediary product, the project proponent shall demonstrate, through sales records, that the intermediary material is being used in final products. This may also include attestations from the final product producer that the material produced by the project activity **has an equivalent quality to conventional plastic-made product**s and meets all standards and requirements to be sold into the commercial market
2	The methodology assumes that the plastic produced using alternate materials will replace the amount of plastic (adjusted to the ratio of densities) that would have only been produced in the country where the project takes place. This assumption is correct if the country produces more plastic than it consumes, meaning it is reasonable to assume there is no need to import plastic since all plastic consumed in the country are produced in the country. However, there could be situations where a country may need to import plastics resins, for example, from another country or region since the amount of plastic consumed is lower than the amount produced internally, means that 1 ton of plastic produced using alternate materials would actually also displaces the production of plastics using petroleum products in another country. For example, if 1 ton of plastic using alternate materials displace 1 ton of plastic using petroleum products and 20% of the plastic consumed internally is imported, 1 ton of plastic using alternate materials would displace 0.8 tons of plastics produced in the host country and 0.2 tons of plastics produced in another country/region.	Include provisions similar to the CDM methodologies AMS-III.AJ and AMS-III.BA (quote by this proposed methodology) to apportion the emissions from plastics produced internally and exported out of the total plastics consumed in the country where the project is implemented.	AMS III A.J. states that only "the baseline emissions which would take place in non-Annex I countries shall be credited." What this means is that if a project is done in the US or Europe, it essentially can't generate credits. In practice, Table 2 in the methodology sets out a discount factor (56% in the case of plastic) that represents non-Annex I production compared to worldwide production. The PP believes that this approach is appropriate for CDM projects, where CERs could only be generated by projects in non-Annex 1 countries -- but is not appropriate for a global voluntary carbon market where offset projects can take place anywhere.	Closed.	N/A	N/A	
3	The parameter PEinc,y includes emissions from the eventual incineration of a portion of plastics, and may als include natural degradation of the alternative material after disposal. The equation contains the relevant parameters to determine emissions from the incineration of plastics, howev it does not provide guidance to determine emissions from natural degradation, e.g. form the anaerobic decomposition if the plastic is disposed in a landfil	Include guidance and equations to determine emissions from natural degradation of the plastic, e.g. CH4 emitted from the decay of the alternate plastic material if the plastic is disposed in a landfill.	The project proponent has decided to limit the methodology to inorganic alternative materials only, so there is no risk of decomposition or emissions of methane at end-of-life.	Closed.	N/A	N/A	
4	Footnote 6 contains an example to estimate the emissions of CO2 from the decomposition of CaCO3. However, the units for the 1:1 ratio provided is not correct.	According to the chemical equation CaCO3 à CaO + CO2, 1 kmol of CaCO3 produces 1 kmol of CO2; therefore the 1:1 ratio should be in kmol instead of tons. To convert to mass units, one shall take into account the mass of 1 kmol of CaCO3 and 1 kmol of CO2, equal to 100 kg/kmol and 44 kg/kmol respectively. Therefore, the ratio in mass units should be 1 : 0.44.	Change has been made in methodology	Closed.	N/A	N/A	
5	The unit of the parameter is TJ	The unit should be referenced per mass unit basis, i.e. TJ/ton.	Change has been made in methodology	Closed.	N/A	N/A	
6	This parameter shall be determined based on data from "credible international or national government sources such as the U.S. EPA". The methodology should allow for additional data sources if national data are not available or if international data does not reflect the practice of plastic production in the host country (e.g. higher CO2 intensive electric grid for the polymerization process), provided appropriate conservative approaches and values. For example, the CDM methodologies AMS-III.AJ and AMS-III.BA provide default emission factors for the production of plastics from virgin materials that are based on conservative assumptions.	The "Source of data" row could be read as: Use values from credible international or national government sources, such as the U.S. EPA (see Appendix II for more information on the data used to calculate this variable in the U.S.). If national data are not available or if international data does not reflect the practice of plastic production in the country where the project is being implemented, proponents may follow approaches from standards developed by other market-based mechanisms provided they apply conservative assumptions.	Change has been made in methodology	Closed.	N/A	N/A	
7	The description of the parameter provided in the row "Description" does not match with the description provide in equation 6.	Include the correct description of the parameter.	Change has been made in methodology	Closed.	N/A	N/A	
8	The description of the parameter contained in the row "Description" does not match with the description provided in equation 6	Include the correct description of the parameter.	Change has been made in methodology	Closed.	N/A	N/A	
9	The description of the parameter contained in the row "Description" does not match with the description provided in equation 6	Include the correct description of the parameter.	Change has been made in methodology	Closed.	N/A	N/A	
10	1) The frequencies specified in the rows "Frequency of monitoring/recording" are "Once during the crediting period", without further indicating at which timeframe the parameters should be determined. 2) In the rows "Description of measurement methods and procedures to be applied", the proponent shall weigh a sample of product (alternate plastic material and original plastic). No additional guidance is provided to determine whether the sample is representative or not.	1) Recommend to clearly indicate when these parameters should be determined, e.g. during the first year of the crediting period or not beyond one year after the project start date. 2) Either include the minimum confidence/precision levels that must be achieved, or provide guidance to conduct the sampling (e.g. sample size, sampling frequency, sampling method, etc).	For #1, this is typically provided by validation, but we can make clear. For Point #2, this has been addressed in the methodology	#1 - no change observed, still says once per crediting period #2 - no change observed	See response to CAR 3		For #1, following language added: Once during the crediting period, at validation. If a new type of material or product is started during the crediting period, this data will be provided to the VVB upon the next verification. For #2, see new response to CAR 3.
11	The table does not indicate the units of the values provided.	Include the units of the values.	Actually, tCO2eq are the units as stated in the note above the table	Closed.	N/A	N/A	
12	It is our strong belief that this methodology supports activities in conflict with the intentions of the Verra Plas Program. Specifically, this methodology does not consider the negative implications of the suggested alternative materials ingredients on waste management & circularity of plastics. It is expected that activities in line with the methodology will reduce plastic recycling rates and reduce the belief in Verra's intention to increase recycling and a circular economy for plastics. Calcium Carbonate is a known additive to plastics. Presence of CaCO3 in polymers will significantly reduce the polymer sorting performance, as well as recycling equipment lifetime. It is strongly recommended that Verra reconsiders the alignment between programs and the impacts of this project type on plastic waste		MORE OF A QUESTION FOR VERRA	Closed - not clear that comment is germane to methodology	N/A	N/A	
13	We suggest avoiding combinations of recyclable polymers with non-recyclable, non-polymer, or non-separable additives.		This stipulation would be acceptable	Was any change made on account of the comment?	Upon reflection, we feel this stipulation would be problematic because it would be too broad. Some additives can be and are recycled but an additive could be anything so we don't think its inclusion makes much sense.	Does this have any implications for the methodology or project?	According to Okeanos, this will not have any implications for the methodology
14	If a circular plastics economy is taken into account, all recyclable polymers should not be mixed with CaCO3 o other additives that reduce sorting and recycling performance. This includes PP, PET, LDPE, HDPE. Also polymers that contaminate recycling of above mentioned polymers, like PVC, should not be mixed with CaCO3 to allow for the waste sorting to separate these streams		In actuality, products that contain calcium carbonate can be recycled	Closed - not clear that comment is germane to methodology	N/A	N/A	
15	Suggest to include the actual times a polymer is recycled in the EF calculation, and allow for regular updates. Similar to point 6. However for the recycling scenario. For the polymers with alternative materials included, the recycling rate will be close to 0		We can't really see how it can be known how many times a polymer is recycled	Closed - not clear that comment is germane to methodology	N/A	N/A	

APPENDIX C - Stakeholder Comments

16	No specific details required or guidance on degradation conditions & impacts. Recommended to add these for consistency with plastics program		The project proponent has decided to limit the methodology to inorganic alternative materials only, so there is no risk of decomposition or emissions of methane at end-of-life.	Closed.	N/A	N/A	
17	The incineration rate for alternative materials is the same as conventional - agree with this assumption in general. As the material is bio-based, will it release further emissions during degradation & will these be accounted for?		The project proponent has decided to limit the methodology to inorganic alternative materials only, so there is no risk of decomposition or emissions of methane at end-of-life.	Closed.	N/A	N/A	
18	Recommended expanding on the requirements and specific points to address when demonstrating that th project will cause "no greater negative environmental or social impact than the production and use of conventional petroleum-based plastics". Specifically the current standard LCA process does not account for the full range of impacts of plastic (i.e. pollution and waste management). It is recommended that the scope of impact should also be extended to disposal of the materials & products as a key consideration for the production & circularity of new material		ADDRESSED UNDER FIRST ENVIRONMENT COMMENTS	Issue remains open pending resolution of corrective action related to parameter EF_{AM}	See same finding in other sheet	Issue remains open	Does adhering to ISO standard now mentioned address this issue?
19	Recommended that the boundary is extended to include use & disposal / waste management.		When considering whether to include aspects like waste management into a methodology, it is important to consider what GHG impacts would happen as a result of the project or in both the project and baseline scenarios. Just as an example, one could consider the transport of specific consumer products (whether baseline or project) to a landfill. But if these emissions would take place regardless of the baseline or project case, they would not have to be considered -- there is no net GHG difference between project and baseline. This is why we took pains to consider situations that would occur in one scenario but not the other. Some aspects of waste management are considered, such as waste incineration.	Closed	N/A	N/A	
20	Suggest to remove CaCO3 from the positive list, as a known additive to reduce recycling rates for intended polymers. CaCO3 additives have the calculated risk to improve overall emissions due to reduced recycling and increased production of virgin plastics.		CaCO3 can be recycled, actually, and it is true that it is used as an additive. Thus the methodology will require a product eligible only if the CaCO3 content in the product is more than 50%.	Closed	N/A	N/A	
21	Suggested to include regional recycling rates, and emission reduction due to the avoidance of virgin plastic. Different recycling technologies and their emissions should be taken into account.		It's not clear exactly what this comment is getting at. If the recycling rate in one country is 10%, should baseline emissions should be reduced by 10%. And if it's 15% in another country, then reduce 15%? If that's the case, we can discuss that.	Comment is N/A. The scope of the methodology does not cover recycling activities	N/A	N/A	
22	Refer/Use CDM tool 05 for calculation of GHG emissions from electricity. This equation is incomplete as it does not include TLD losses. Similarly remove data and parameters associated with it		Other Verra methodologies do not include T&D losses in project emissions, including VM0040 and VM0043.	Closed - procedure for the quantification of electricity emissions is consistent with accepted GHG accounting practices	N/A	N/A	
23	Refer/Use CDM tool 03 for calculation of GHG emissions from fossil fuel combustion. Similarly remove data and parameters associated with it		Other Verra methodologies do not include T&D losses in project emissions, including VM0040 and VM0043.	Closed - procedure for the quantification of electricity emissions is consistent with accepted GHG accounting practices	N/A	N/A	
24	Thank you for the opportunity to comment on the Methodology for the Use of Alternative Materials that Displace the Production of Plastics (v1.0). ClimeCo is a leader of project development in North America, with extensive experience in methodology design, drafting, and implementation. In early 2021, ClimeCo launched our Plastics Program to scale the recovery and reduction of environmental waste, limit the use of virgin plastics, and reduce associated greenhouse gas (GHG) emissions. Plastic production is an extremely emissions intensive process. Overall, ClimeCo believes this methodology has the potential to create an important mechanism to incentivize the displacement of conventional plastics and create significant GHG emission reductions, that would not have occurred otherwise. Creating a market for incremental emission reductions above-and-beyond historical voluntary reductions will incentivize additional reductions and ensure the plastic industry continues to transition to lower-impact alternative materials. Although we believe this methodology could be an influential step towards significant global GHG emission reductions, ClimeCo suggests that the Verified Carbon Standard (VCS) alter the additionality component of the methodology to ensure that the Verra program upholds the utmost rigor and impact.		No comment required	N/A	N/A	N/A	
25	Currently, the methodology allows, "An activity method for the demonstration of additionality for project activities that use alternative materials from calcium carbonate, and a project method for projects that produce alternativ materials made from materials other than calcium carbonate." We believe that the VCS should limit the activity method based on the type of alternative material along with the type of displaced conventional plastic, rather than solely on the type of alternative material. Currently, calcium carbonate is a commonly used filler, or additive, in some sectors of the plastics industry, including packaging.(1) The North American precipitated calcium carbonate market (PCC) is expected to continue to grow over the coming decade, primarily due to consumer demands from both the paper and plastic industries.(2) Specifically, the demand for calcium carbonate to be used as an additive in polyvinyl chloride (PVC) is expected to substantially contribute to this market growth.(3) We would like a better understanding on a per-product basis whether the use of calcium carbonate is additional. While it is possible that the use of PCC as an additive in PVC or other products may be considered additional at the time of drafting this methodology, we would like confirmation that the penetration rate falls below 5%. Without confirming additionality by product, an activity method for additionality may allow for non-additional industries to generate credits. For this reason, we believe it is important to base additionality on the type of product that the alternative product is displacing, as opposed to solely on the type of alternative product. Thank you again for this opportunity to comment on the Methodology for the Use of Alternative Materials that Displace the Production of Plastics. The methodology has the potential to open the door to opportunities to reduce GHG emissions and bring to market high-quality carbon offsets. (1) Wood, L. (2021, March 16). The Calcium Carbonate North American Industry is Expected to Grow at a CAGR of 3.4% Between 2020 and 2026 – ResearchAndMarkets. www.businesswire.com/news/home/20210316005915/en/The-Calcium-Carbonate-North-American-Industry-is-Expected-to-Grow-at-a-CAGR-of-3.4-Between-2020-and-2026---ResearchAndMarkets.com (2) AP News. (2019, November 26). Ultrafine Precipitated Calcium Carbonate Market The Next Big Thing in Paper Manufacturing and Plastics Industry Across the Globe. https://apnews.com/press-release/pr-wiredrelease/ea7ce9b883e6ca1f9afcf40b0c42813c (3) Grand View Research. (2017. March). North American Calcium Carbonate Market Size, Share & Trends Analysis Report By Application (Industrial fillers, Rock dust, Water treatment, Citric acid production), By Region, And Segment Forecasts, 2018 – 2025. https://www.grandviewresearch.com/industry-analysis/north-america-calcium-carbonate-market		Yes, CaCO3 is commonly used in the conventional plastics industry as a filler. The difference being that no company has been able to displace up to 70% of plastic with CaCO3. The methodology will propose that at least 50% of a product contain CaCO3 to be eligible for carbon offsets. A typical filler may be 5% CaCO3.	Closed pending approval of positive list by standardized methods expert			
26	The use of, what the methodology calls, "Alternative Materials", for example Calcium Carbonate (calcites) and Talc (silicas), have been used for decades in the plastic industry to reduce costs. The common term for them is "filler." In fact, some of the most common "useful products" purchased by consumers, like straws and single use cutlery, contain fillers. This has been the baseline scenario of the plastic market for decades. This methodology rewards the plastic industry for something they already do to increase their profits. Instead, at a minimum, projects (products) that already use fillers must not be considered as this is already their baseline scenario. Instead, in order to have the proper impact to reduce GHG, it must be demonstrated that a project's previous baseline scenario did not use "Alternative Materials".		Same as above (percentage of CaCo3 consideration)	Closed pending approval of positive list by standardized methods expert			
27	VM0040 requires that carbon credits are only generated when there is a salable product. This sections states "Alternative materials may also be used to make products that completely displace the use of conventional plastics."	This is not strong enough language and should state **Must** be used to make **useful products**".	This is already covered in the methodology, which requires the PP to demonstrate the products must be sold in the commercial market.	Closed.	N/A	N/A	

APPENDIX C - Stakeholder Comments

28	In context of the methodology as a whole, we suggest that this is too broad, and in fact the methodology itself is too broad. It is currently stated, "Alternative materials are incorporated into plastic substitutes—products that have the same uses as conventional plastic—thereby displacing the need for such plastic"	Given the context and formulas in the methodology, we suggest, "Alternativ materials **are inorganics** that are incorporated into plastic substitutes—products that have the same uses as conventional plastic—thereby displacing the need for such plastic". And remove any mention of organics like seaweed	The project proponent has decided to limit the methodology to inorganic alternative materials only, so there is no risk of decomposition or emissions of methane at end-of-life.	Closed	N/A	N/A	
29	The definition of conventional plastics must be better defined. The reason is as new plastics are developed, like PLA, eventually they become conventiona	In this case we recommend, "Conventional plastic is made synthetically from petroleum-based materials and are in no way biologically derived	This change would be acceptable	Was any change made on account of the comment?	Change made in definitions section -- see conventional plastics	Closed.	
30	While the definition of plastic market is currently defined as "The plastics market refers to the companies that manufacture plastic products and the companies that buy those products." This is too vague given the size of the plastic industry and does not specifically state where the final boundary for the project should be. We purpose, "The plastics market refers to the companies that manufacture useful products." Again, the reason for this is the plastic market is massive. You have several steps in the supply chain to make a final product - resin producers, additive producers, fabricators but even they may not be a manufacturer of a "useful product". Resin made by a Dow or Exxon is not in a form that is a "useful product."	We purpose, "The plastics market refers to the companies that manufacture useful products."	This change would be acceptable	Was any change made on account of the comment?	Change made in definitions section	Closed pending discussion. Would this definition mean that Okeanos is not part of the plastics market?	
31		Likewise, the definition of Plastic Substitutes should state: "Projects applyin this methodology will manufacture **useful products** that have the same functions as conventional plastic but are partially or completely made from alternative materials.'	This change would be acceptable	Was any change made on account of the comment?	Change made in definitions section	Closed pending above discussion.	
32	Comment – Why does the addition of additives like calcium carbonate, which have been used in conventional plastics for decades to lower cost, now create a situation for them to generate carbon credits? This is not a new technology that will effectively reduce GHG as plastic producers are already motivated to use these materials to reduce costs.		Yes, CaCO3 is commonly used in the conventional plastics industry as a filler. The difference being that no company has been able to displace up to 70% of plastic with CaCO3. The methodology will propose that at least 50% of a product contain CaCO3 to be eligible for carbon offsets. A typical filler may be 5% CaCO3.	Closed - added applicability condition	N/A	N/A	
33	It is stated that "If no specific displaced polymer is identified, project proponents shall use the most conservative EF, as indicated in Appendix 2, which is HDPE with an EF of 1.47 tCO2eq emitted per tonne of plastic." Currently this type of assumption is not allowed in VM0040 and each polymer type trying to be displaced must be verified.		This provision simply offers flexibility that if a particular type of plastic type cannot be identified with 100% certainty of displacement that the most conservative default be used. In some cases, there may be ambiguity about which plastic type would be replaced -- or it cannot be conclusively demonstrated what plastic type is displaced. This option would therefore be the most conservative because the lowest emissions factor would be used.	Closed - no requirement to be identical to VM0040.	N/A	N/A	
34	It is stated "The material produced by the project activity must be made partially or completely from an alternative material that has a lower EF than the plastic material it is displacing."	We believe this should say "The **use product** manufactured by the project activity must be made partially or completely from an alternative material that has a lower EF than the plastic material it is displacing	This change would be acceptable	Was any change made on account of the comment?	See change to Applicability condition #3	Closed. Update to Applicability Condition #3 addresses the issue.	
35	It is stated "Project activities must produce a material used to manufacture useful products that are sold in th commercial market. The project proponent must specify what products are being sold in the market and demonstrate to the auditor that the products have in fact been sold." This is where the methodology is not clear to us, who is the benefactor of the carbon credits? If it is the produc of the calcium carbonate or seaweed, how can they demonstrate that the materials they make are actually being used in useful products? They are too far up the supply chai	However, of the beneficiary is the producer of the final products then it should state, "Project activities must produce **useful products** that are sold in the commercial market"	This question was addressed in a previous comment	Issue remains open pending resolution of findings related to intermediary/final products	Pending resolution of other findings	Issue remains open	We believe other responses addresses this question
36	It is stated "Evidence should be provided as to whether the alternative material in the plastic substitute will degrade over time"	This should state, "For **organic materials**, evidence **must** be provided as to whether the alternative material in the plastic substitute will degrade over time"	The project proponent has decided to limit the methodology to inorganic alternative materials only, so there is no risk of decomposition or emissions of methane at end-of-life.	Closed - definition of alternative material changed	N/A	N/A	
37	The project boundaries in Figure 1 are too limited and do not properly take into account all the steps that would lead to a final product. VM0043 has many more steps that take into account transport to the final sight.	Extraction or creating of alternative materials t Alternative Materials to Blended products to Plastic Substitutes to Plastic Market	This diagram was based in part on VM0040, which seems a more appropriate comparison for this methodology.	Issue remains open pending resolution of findings related to intermediary/final products	We believe the diagram covers the segments of the market covered by the project activity but happy to discuss. But we did add the notion of blended plastics, plastic substitutes in the bullets above the diagram.	Do the baseline emission factors for traditional plastic materials include production of products by the end-user? (see row 47 below as well)	EPA has confirmed that WARM model does NOT include final production. Email sent to FE
38	It is stated in Table 2 that N2O is excluded for simplicity. In fact, N2O is most commonly used as a fertilizer. While not relevant to inorganics, this is very important for organics. If N2O, or other fertilizers that generate GHG, is applied it should be a project emission. We also have trouble understanding how this could be calculated as a reduction.		If an organic material is grown on a farm -- and fertilizer is used -- then this would be a valid concern. While the project sponsor of this methodology is not using organics, much discussion has been around plastic displacement coming from seaweed, which would not use any fertilizer. We could put into the methodology a stipulation that if organic materials are used, they cannot be grown with synthetic fertilizer. It is hard to imagine, however, a crop being grown for use in a product that would displace conventional plastic material.	Closed - definition of alternative material changed	N/A	N/A	
39	States "The baseline scenario is the continuation of manufacturing plastic material through traditional processes" As previously stated, conventional plastic has used filler like calcium carbonate and talcs for year to reduce the costs. These types of "alternative materials" have been a baseline scenario for the conventional plastic industr decades, so we fail to see how this effects the plastic industry and instead rewards them for something they already do.	We strongly feel this should use the proposed definition "The baseline scenario is the continuation of manufacturing **conventional plastic material through traditional processes that previously did not use alternative materials**"	This question was addressed in a previous comment, and the methodology will require a minimum amount of alternative material content that would be clearly above and beyond what is currently seen in the market.	Closed - added 50% minimum threshold	N/A	N/A	
40	States "Baseline emissions are determined by quantifying the amount of conventional plastic production that has been avoided through the manufacture and sale of plastic substitutes using alternative materials."	We feel it should read "Baseline emissions are determined by quantifying the amount of conventional plastic production **that was used in a useful product** that has been avoided through the manufacture and sale of plastic substitutes using alternative materials.	We believe the original wording is clearer because the baseline emissions are determined by conventional plastics that are displaced, not conventional plastics are used in a useful product, the definition of which is more geared to the products produced by the project activity.	Response to comment is unclear. Issue also remains open pending resolution of findings related to intermediary/final products		Issue remains open	This section changed to read: "Baseline emissions are determined by quantifying the amount of conventional plastic production that was used in a useful product, that which has been avoided through the manufacture and sale..."
41	While these calculations work fine for inorganics, where the molecular structure of the material is known, this is not try for organics and calculating the biogenic update of GHG seems to be much broader than the scope of this methodology would allow			Closed - definition of alternative material changed	N/A	N/A	
42		There should be a note that states that Alternative Materials made from CO2 and biodegrade assumes no benefit	This has been addressed in the methodology	Closed - inorganics only	N/A	N/A	
43	Project emissions maybe missing steps depending on the boundary. See statement under Section 5. Fc example: Emissions associated with extraction or creating of alternative materials to Emissions associated with blending (commonly called compounding) Emissions associated with plastic substitutes Emissions associated with final fabrication of produc		These emissions are included in the project emissions section, regarding energy requirements of the facilities where these steps take place.	Issue remains open pending resolution of findings related to intermediary/final products. If the scope of the methodology includes final products, emissions associated with final fabrication of product may be relevant	*To complete -- do we need to include project emissions from final product producer*	Do the baseline emission factors for traditional plastic materials include production of products by the end-user?	EPA has confirmed that WARM model does NOT include final production. Email sent to FE
44		For organic materials, should include emissions associated with biodegradation.	This will be addressed in the methodology	Closed - inorganics only	N/A	N/A	
45		If fertilizer used, emissions associated with fertilizer.	This does not seem relevant	N/A - comment is not germane to the scope of the meth	N/A	N/A	
46	No comments but will have to be changed based on what is taken into account from all the above.			N/A	N/A	N/A	
47	No comments		NO ANSWER REQUIRED	Closed	N/A	N/A	
48	Section 2 provides a summary of the methodology, and exemplifies alternative materials as calcium carbonate and seaweed. As these are mentioned only as examples, it becomes clear that the methodology allows the use of many other alternative materials that have a lower carbon footprint / environmental impact than the original fóssil-derived plastics. Section 3 provides a definition of alternative materials. It is important to let clear that other materials might be allowed, not restricted to CaCO3 and Seaweed. Other materials might include products derived from wood sources, such as lignin, microfibrilated celulose, and others.		If other materials are be used, project developers can do that provided they show the additionality, as was done for CaCO3 (penetration rates, etc.). This can be handled by methodology amendment.	Closed	N/A	N/A	
49	The definition of "conventional plastic" in section 3 only includes thermoplastic materials. It is important to extend this list to thermoset materials, such as polyurethanes, polyisocianurates, and phenolic resins. These materials might also be benefited by the use of alternative materials. This list of materials has to be updated also in section 4, item 1 .		We have not included these materials because there are not straightforward displacement factors, such as those listed in VM0040 and AMS III A.J. If such widely accepted default factors are established, the methodology could perhaps be amended.	Closed	N/A	N/A	

APPENDIX C - Stakeholder Comments

50	Section 4, item 6, mentions that upon incineration the CO2 content in CaCO3 should be accounted as emission. This is not valid in all conditions, it will depend on the temperature of the incineration furnace. If lower than 550degC, the temperature will not be enough to activate the degradation of CaCO3 and the mineral will remain with the CO2 content in it. Equations in section 9 should reflect this end of life characteristic of the material.		If the CO2 remains in the mineral, that is conservative, which is fine. That means it has not been emitted as CO2, and if anything we have overestimated project emissions -- that's ok.	Closed	N/A	N/A
51	The methodology seems to focus exclusively on Cradle to Gate. For compostable materials, the net benefits a in Gate to Grave. Most, if not all, alternative materials will not be as efficient as conventional plastics from a GHG perspective. For compostables that are collected with food waste, there is the added benefit of carbon sequestration. How does your methodology plan to account for this?		It sounds like this concern would only apply to situations in which the alternative material would break down, such as a bio-based product. This would not be the case for CaCO3 and is thus not applicable to this methodology.	Aren't degradable materials to be excluded?	Yes, this comment (Cell J55) has been amended and the methodology excludes degradable materials	Closed
52	Another important consideration is where the application of alternative materials makes most sense. Ie a compostable water bottle is by no means a good outcome; however compostable flexible food packaging can be. How will the methodology ensure this?		We believe the market should best determine where products made from alternative materials do and do not make sense. The products themselves do have to be sold, which is a requirement in the methodology. Otherwise, we think the methodology itself should not try and assess what types of products should or should not be made from alternative materials	N/A - comment is not germane to the methodology approval process	N/A	N/A
53	We are seeing a plethora of packaging companies that are developing (oxo)-biodegradable solutions, however there is no standard for this. The only standard that should be considered is compostable according to norm EN13234 (and other comparable standards). What is your perspective on this?		The project proponent has decided to limit the methodology to inorganic alternative materials only, so there is no risk of decomposition or emissions of methane at end-of-life.	N/A - comment is not germane to the methodology approval process	N/A	N/A