



**Verified Carbon
Standard**

CARBON CAPTURE AND STORAGE METHODOLOGY ASSESSMENT REPORT



Document Prepared by Aster Global Environmental Solutions Inc.

Methodology Title	Carbon Capture and Storage
Version	1.0
Methodology Category	Methodology
Sectoral Scope(s)	16 Carbon Capture and Storage
Report Title	Methodology for Carbon Capture and Storage Methodology Assessment Report
Report Version	1.0 -

Client	Perspectives Climate Group
Pages	300
Date of Issue	26 June 2024
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Summary

Aster Global Environmental Solutions, Inc., (Aster Global) was commissioned by the Perspectives Climate Group to perform the methodology assessment of the new methodology *VM0049 Carbon Capture and Storage (CCS)*, in accordance with the VCS Methodology Development and Review Process, VCS Program Guide, VCS Standard, VCS Methodology Requirements, and VCS Program Definitions. A specific carbon offset project will be able to use this methodology combined with applicable capture, transport, and storage modules for a project using this modular approach

The purpose and scope of this methodology assessment was to evaluate whether the methodology document was prepared in conformance with the VCS program requirements. Aster Global's methodology assessment included a detailed review of adherence to the VCS requirements regarding applicability conditions, project boundary, baseline approach, additionality, emissions/removals, leakage, uncertainty, monitoring, data and parameters, and adherence to the principles of the VCS rules and requirements (relevance, completeness, consistency, accuracy, transparency, and conservativeness). Aster Global's methodology assessment also included a detailed analysis of the methodology, public comments and responses, Verra questions posed for public comment and responses, Verra methodology review and technical reviews, and responses to all non-conformance reports (NCRs), clarifications (CLs), and opportunities for improvement (OFIs) based on the VCS rules and requirements.

The methodology was listed for public stakeholder consultation from 30 June 2023 to 29 July 2023. Verra posed 10 key questions for public comment. There were 137 comments received in response to those questions. In addition, there were a total of 175 public comments received during this consultation process. The methodology assessment team identified 83 findings (NCRs, CLs and

OFIs). All were addressed satisfactorily in line with the VCS program requirements. These NCRs, CLs, and OFIs provided necessary clarity to ensure the methodology complied with the VCS rules and requirements.

Aster Global confirms all methodology assessment activities, including objectives, scope and criteria, level of assurance and the methodology's adherence to the VCS Program, as documented in this report, are complete. Aster Global concludes without any qualifications or limiting conditions that *VM0049 Carbon Capture and Storage (CCS)* meets the requirements of the VCS Program. Aster Global recommends that Verra approve the methodology.

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1 INTRODUCTION

1.1 Objective.

This methodology assessment was performed to evaluate the likelihood that implementation of the methodology would result in accurate calculations and appropriate eligibility criteria for GHG emission reductions/removals (ISO 14064-3:2019). This assessment evaluates the first methodology in the framework that will include 14 modules and another methodology. This methodology provides the framework for carbon capture and storage projects. Subsequent reports will be prepared for the remaining modules and methodology.

This report summarizes the findings of the methodology assessment of the Verified Carbon Standard (VCS) methodology development and review process. The Perspectives Climate Group, referred to as the “methodology developer”, has commissioned Aster Global Environmental Solutions, Inc. (Aster Global), referred to as the “assessment team,” to perform the methodology assessment of *VM0049 Carbon Capture and Storage*, hereafter referred to simply as the Methodology.

This report presents the findings of a qualified methodology assessment team of auditors and experts in methodologies for GHG emissions, who have assessed the methodology under the applicable rules of the VCS Program. Section 2 below presents the methodology assessment approach, Section 3 below summarizes the methodology assessment process and conclusions, Appendix A lists the documents reviewed during the assessment. Appendix B provides details and resolutions of all individual findings from the methodology assessment process. Appendix C presents the public comments and responses to those comments. Appendix D presents the comments and responses to Verra’s key questions. Appendix E includes the Forward Action Requests from the Verra Methodology Review Report that are relevant to this methodology assessment and responses.

1.2 Summary Description of the Methodology

This methodology establishes framework, criteria, and procedures to quantify the greenhouse gas (GHG) emission reductions and carbon dioxide removals from Carbon Capture and Storage (CCS) projects.

This carbon capture and storage methodology framework provides the overall project requirements for a specific project. It is designed to integrate technology modules as needed to complete the project requirements. The modules establish criteria and procedures for quantifying emissions from specific capture, transport, and storage activities. A specific carbon offset project will be able to use this methodology combined

with applicable capture, transport, and storage modules for a project using this modular approach.

2 ASSESSMENT APPROACH

2.1 Method and Criteria

This methodology assessment is based on standard auditing techniques in line with Verra requirements to assess the correctness of the information provided. In accordance with the VCS rules, a methodology assessment encompasses applicability conditions, project boundary, procedure for demonstrating additionality, procedure for determining baseline scenario, baseline quantification, leakage, quantification of net GHG emission reduction and/or removals, monitoring, data and parameters, and relationships to approved or pending methodologies.

The Verra documents used to assess the Methodology were:

- Program Guide (v4.4, 29 August 2023)
- Program Definitions (v4.4, 29 August 2023)
- Methodology Requirements (v4.4, 4 October 2023)
- Methodology Development and Review Process (v4.3, 4 October 2023)
- Methodology Template (v4.3, 29 August 2023)
- Methodology Assessment Report Template (v4.2, 29 August 2023)
- Standard (v4.5, 4 October 2023, v4.6, 21 March 2024, v4.7, 16 April 2024)

2.2 Document Review

Documents provided and reviewed are listed in Appendix A.

2.3 Interviews

Interviews were conducted online using Microsoft Teams via typical channels, including the opening meeting, methodology walkthrough, meetings to discuss reviews and findings, in addition to email exchanges, phone calls, and the closing meeting. Details and attendees of each meeting are included below:

Opening Meeting		7 November 2023
Methodology Assessment Team Barbara Toole O'Neil Drake Fisher	Methodology Development Team Matthias Porella Matthias Krey Engin Mert	
Meetings – Reviews and Issues		16, 22,30 November 2023 13,20 December 2023 10,14 January 2024 5,13,20,29 February 2024 6,13,20,27 March 2024 5,10,18,25 April 2024 2,9,16,23 May 2024
Methodology Assessment Team Barbara Toole O'Neil Drake Fisher	Methodology Development Team Engin Mert Gamze Karaca Matthias Krey	
Meetings – Discussions of Verra Requirements		19 January 2024 29 February 2024 3 May 2024
Methodology Assessment Team Barbara Toole O'Neil Drake Fisher	Methodology Development Team Engin Mert Matthias Krey	
	Verra Ian Kuwahara Jordan Kummerfield	
Closing Meeting		26 June 2024
Methodology Assessment Team Barbara Toole O'Neil Drake Fisher	Methodology Development Team Engin Mert Gamze Karaca	

2.4 Assessment Team

The names, roles, and summary of qualifications/expertise/experience relevant to the methodology assessment team follow:

Name	Role	Summary of qualifications, expertise, relevant methodology experience
Barbara Toole O'Neil, MS ChemE, QEP	Lead Assessor/Approved Standards Methods Expert	Since 2010 she has completed assessments of 14 new methodologies. Her work responsibilities have addressed a wide range of environmental issues from preparing inventories or offset project documents to assessing methodologies submitted to the Verified Carbon Standard (VCS) (forestry to energy efficiency); , validating/ verifying inventories and carbon offset projects, corporate social responsibility auditing,

		<p>developing governance for sustainability non-profits, to writing a social standard to assess the impact of environmental projects (carbon, water, forestry, agriculture) on the quality of life for women in emerging third world countries</p> <p>She has the following accreditations: ICAO Certified CORSIA Verifier, Accredited Lead Verifier for California Air Resources Board under the mandatory reporting rule (H-21-133), Accredited Lead Verifier for California Air Resources Board under the Compliance Offset program, Ozone Depleting Substances (ODS) offset project specialist and livestock project specialist (H2- 19-198), Verra (VCS) Approved Standardized Methods Expert, ANAB Assessor for 1SO-14064.</p> <p>Prior to her focus on climate services, Ms. Toole O'Neil was an experienced engineer and research manager focused on energy, air quality and environmental issues. She has worked as a process engineer, research manager, regulatory inspector, and consultant. The work includes pre and post combustion research for fossil- powered generation focusing on fuel, fuel quality and fuel upgrades while with EPRI. At EPA she was an accredited enforcement inspector in Air Division of EPA Region 9 focusing on power generation, and the cement industry. She is a published fuels and combustion expert and has over 120 publications including a book on combustion research to control emissions of criteria and air toxic pollutants. In addition to Aster Global work, she is currently a member of the Hearing Board of the Bay Area Air Quality Management District.</p>
<p>Drake Fisher, BS Mech Eng.</p>	<p>Assessment Team Member</p>	<p>Drake Fisher, has worked on verifications and validations across multiple sectoral scopes for VCS, ACR, CAR, GHG Protocol, and the Canadian GHG Reporting Program (Sask & BC). Drake has consulted on the development of two VCS Methodologies and is now part of the methodology assessment team for this VCS methodology. Prior to working at Aster Global he worked for six years as a new product development engineer for Stanley Black & Decker, and Pentair Inc. This work included overseeing a small design team, conducting Finite Element Analysis for part stress/airflow optimization, and reviewing manufacturing processes to ensure that parts and assemblies met all design criteria. Relevant course work from The Johns Hopkins University Mechanical Engineering degree includes Fluid Mechanics, Heat Transfer, Design and Analysis of Dynamic Systems, Mechanics Based Design, and Electronics & Instrumentation.</p>

<p>Janice McMahon. MS Env Science</p>	<p>QA/QC / President</p>	<p>Janice McMahon has been conducting third-party validations and verification since 2007 and has been responsible and oversees the accredited VVB activity under ANAB for her previous employer and Aster Global for the past 14 years.</p> <p>Janice has been the Lead Verifier on over 85 organizational-level GHG inventory verifications focusing on the energy sector in Canada (BC and TCR) and has provided technical review or QA/QC on 100+AFOLU offset projects and methodology assessments for VCS, CCB, CAR, ACR, ARB and NFS.</p> <p>Janice holds multiple accreditations including : ICAO Certified CORSIA Verifier, ISO 14064 Series Class Certifications, and Certified Wildlife Biologist. As President, Janice is responsible for leading Aster Global teams on Validation/Verification and auditing projects all around the world.</p>
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2.5 Resolution of Findings

The process of methodology assessment involved formal rounds of evaluation called findings by the assessment team followed by additional clarifications and resulted in a methodology version in conformance with VCS rules. Findings related to corrective action, clarification requests or other findings were resolved during communication between the assessment team and the methodology development team. More specifically, where noted by the assessment team, the methodology development team implemented corrective actions by amending methodology text and requirements and providing written clarification responses. Types of findings were characterized in the following manner:

Non-Conformance Reports (NCRs) were issued as a response to material discrepancies in a part of the methodology and generally fell into one of the following categories:

- Non-conformance to a VCS guiding document listed in Section 2.1 above
- Internal consistency among methodology sections was lacking
- Lack of clarity in definitions, calculations, and boundary conditions
- Additional information was required by the assessment team in order to confirm reasonable assurance for compliance

Clarifications (CL) were issued when language within the methodology needed extra clarification to avoid ambiguity/confusion for the reader.

Opportunities for Improvement (OFI) were issued to the methodology developer when an opportunity for improvement was identified but was not required to be addressed to confirm to VCS rules.

During the course of the methodology assessment, 83 findings (NCRs, CLs, and OFIs) were identified. Of those, Aster Global ensured *reasonable* assurance was achieved to close all findings. Throughout the methodology assessment, all NCRs/CLs were eventually satisfactorily addressed to the standards and requirements of Aster Global and/or VCS. The NCRs/CLs provided necessary clarity to ensure the methodology complied with the requirements of VCS. Detailed summaries of each finding, including the issue raised, responses and final conclusions are provided in Appendix B.

3 ASSESSMENT FINDINGS

The methodology was found to be in compliance with the principles set out in the VCS Methodology Development and Review Process, the VCS Standard and other VCS rules and requirements. The methodology provides the framework for carbon capture project quantification methods, while adhering to the principles of VCS (relevance, completeness, consistency, accuracy, transparency, and conservativeness). A specific carbon offset project will be able to use this methodology combined with applicable capture, transport, and storage modules for a project using this modular approach. The methodology assessment addressed specific issues that arose in the methodology, which are pertinent to the above-mentioned principles set forth by the VCS Standard.

3.1 Relationship to Approved or Pending Methodologies

Methodology	Title	GHG Program	Comments
Carbon Capture and Storage V2 (under scientific peer review)	Methodology for the Quantification, Monitoring, Reporting and Verification of Greenhouse Gas Emissions Reductions and Removals from Carbon Capture and Storage.	ACR	This Methodology provides the quantification and accounting frameworks, including eligibility and monitoring requirements, for the creation of carbon offset credits from the CO2 removals and emissions reductions resulting from eligible projects that capture, transport, and geologically store CO2. Eligible projects under this methodology are those that capture, transport, and inject anthropogenic CO ₂

			<p>during enhanced oil recovery (EOR) operations into an oil and gas reservoir located in the US or Canada where it is sequestered.</p> <p>The Verra framework is more inclusive of other industry sectors and geographic locations.</p>
Biomass Fermentation with Carbon Capture (9 April 2024)	Methodology for Biomass Fermentation with Carbon Capture and Geologic Storage	Gold Standard	<p>This methodology is applicable to biomass fermentation that captures carbon dioxide (CO₂) and injected into a geologic formation.</p> <p>The Verra framework is more inclusive of other industry sectors and geographic locations.</p>
Carbon capture, transport and storage (1 April 2024)	Methodology for project activities involving the capture, transport, and geological storage of carbon dioxide	Global Carbon Council	<p>This methodology applies to project activities that capture carbon dioxide (CO₂) transport it and inject the CO₂, with a focus on the oil and gas sector.</p> <p>The Verra framework is more inclusive of other industry sectors and geographic locations.</p>
Bioenergy with carbon capture	Methodology for measuring net carbon dioxide removal through bioenergy with carbon capture and storage (BECCS)	Drax Energi	<p>This methodology applies to biomass conversion, carbon capture and storage only.</p> <p>The Verra framework is more inclusive of other industry sectors and geographic locations.</p>
Biochar(2024), carbon storage (2024), carbonated materials(2022), enhance rock weathering(2022) and biomass storage(2023)	Multiple methodologies	Puro Earth(puro.earth)	<p>Puro Earth(puro.earth) is an independent registry funded in 2019 by Fortum in Finland. Each methodology is specific for a singular activity.</p> <p>The Verra framework is more inclusive of other industry sectors and geographic locations</p>
Biomass (2024), Bio-oil Geologic Storage (2023)	Multiple methodologies	Isometric (isometric.registry.com),	<p>Isometric is a carbon removal standard and registry founded in 2022. They have two</p>

			<p>methodologies published and one methodology in public consultation.</p> <p>The Verra framework is more inclusive of other industry sectors and geographic locations</p>
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3.2 Stakeholder Comments

The methodology was listed for public stakeholder consultation from 30 June 2023 to 29 July 2023. Verra posed 10 key questions for public comment. There were 137 comments received to those questions. A total of 175 public comments were received during this consultation process for the methodology. Due to total number of comments, separate appendices have been prepared (Appendix C and Appendix D). Verra provided a Methodology Review Report on 26 June 2023. The Methodology Review Report was prepared prior to the public comment period and subsequent revisions by the methodology developer. It was not revised prior to this assessment. The report contained 23 findings with 9 Forward Action Requests (Appendix E).

The assessment team reviewed the public comments, the Verra report and the methodology developer’s responses. The assessment team confirmed the key questions and public comments had been addressed appropriately and closed the responses. The methodology developer incorporated selected comments into a revision of the methodology. All comments, the methodology developer’s response to each comment, and the assessment teams comments and conclusions are included in the Appendix C, Appendix D and Appendix E. This review ensured that the developer has adequately addressed all stakeholder comments.

3.3 Structure and Clarity of Methodology

Through the methodology development and review process, the assessment team ensured the methodology was written in a clear, logical, concise, and precise manner in accordance with the Methodology Development and Review Process using the current version of the Verra template.

The developer has followed the instructions in the methodology template and ensured that the methodology’s various criteria and procedures are documented in the appropriate sections of the template. This was confirmed through a detailed review of the template requirements within the assessment team’s Findings process. Several Findings were issued related to the Methodology’s consistency with the template, and all Findings were resolved to ensure VCS requirements were achieved.

The terminology used in the methodology is consistent with that used in the VCS Program, and GHG accounting generally. The assessment team issued Findings related to VCS definitions, and all Findings were resolved to ensure terminology was consistent.

The key words must, shall, should and may have been used appropriately and consistently to denote firm requirements, (non-mandatory) recommendations and permissible or allowable options, respectively. This was confirmed through the assessments team's overall read, interpretation, and review process. The methodology developer did change terms as a result of the Findings from the assessment team to be more compatible with VCS rules.

The criteria and procedures are written in a manner that can be understood and applied readily and consistently by project proponents. Applicable Findings were resolved to ensure this was achieved.

The criteria and procedures are written in a manner that allows projects to be audited. Several findings were issued to ensure the methodology can be consistently and robustly applied with the proposed modules.

Overall, it is the Assessment Team's opinion that the structure of the methodology document meets the methodological requirements of the VCS Program.

3.4 Definitions.

The key terms defined in the methodology are presented clearly and appropriately in the definitions sections at the beginning of the documents by the methodology developers for ease of use. The methodology assessment process ensured definitions of key terms are presented concisely and can assist the reader in comprehension for effective implementation of the methodology. The definitions section only includes key terms used in the methodology, and not those key terms in relevant to the modules. The definitions section also does not include any terms defined in the Program Definitions v4.5.

3.5 Applicability Conditions

During the methodology assessment process, the assessment team ensured the applicability conditions were appropriate for the activities targeted by the methodology. Quantification procedures required by the methodology adequately target the relevant applicability conditions. The applicability conditions appropriately specify relevant requirements to individual projects. The methodology assessment team determined the applicability conditions contained within the methodology are appropriate, adequate and in compliance with the VCS Program.

Further, the assessment team determined the applicability conditions provide sufficient clarity to projects determining if their activities are or are not eligible under the

methodology. The applicability conditions address environmental integrity and practical considerations, where relevant.

In general, this methodology framework is applicable to project activities that capture atmospheric CO₂ or CO₂ from point sources at a source facility and store it safely and permanently in geological storage complexes using the appropriate modules An assessment of the specific applicability conditions is below:

Applicability Condition	Assessment
<p>1. Project activities must include at least one eligible capture activity and at least one eligible storage activity. If the project activity is not co-located¹ or not adjoining the capture site, it must use an eligible transport activity. However, when the storage sites are co-located or adjoining the capture sites, the capture module boundary is directly attached to the storage module boundary. Thus, the project proponent could cover all equipment under one project boundary without defining a separate module boundary for transport.</p>	<p>This applicability condition provides the broad application of the methodology to CCS activities. The applicability condition is written in a clear and concise manner, ensuring a project adheres to the condition and that conformance can be demonstrated at the time of project validation.</p>
<p>2. The eligible CO₂ capture activities include:</p> <ul style="list-style-type: none"> ○ Direct Air Capture (DAC) as defined in <i>VMD0056: Removals from CO₂ Capture from Air (Direct Air Capture)</i> ; ○ Post-combustion capture from power plants, heat generation operations, or combined heat and power (CHP) units based on fossil fuel combustion or based on geothermal energy as defined in <i>VMD00XX: Emission Reductions from CO₂ Capture from Post-combustion Flue Gases in Fossil Fuel Power and Heat Generation</i> ○ Flue gas capture from industrial processes, including the chemical industry, mineral production, steel production, cement plants, and hydrogen (H₂) production, as defined in 	<p>This applicability condition lists the applicable CO₂ project activities and processes. The probability of conformance with the applicability condition cannot be determined at this time. The modules have not been evaluated or submitted for assessment in some cases. The probability of conformance will have to be evaluated when the modules are being assessed.</p>

¹ Co-located refers to facilities that are situated within a maximum allowable distance from each other that supports direct connectivity and operational integration without the need for extensive transportation infrastructure.

Applicability Condition	Assessment
<p><i>VMD00XX: Emission Reductions from CO₂ Capture from Industrial Processes;</i></p> <ul style="list-style-type: none"> ○ Flue gas capture from oil and gas production and processing, including the capture of native CO₂, acid gas removal, and Liquefied Natural Gas (LNG) production as defined in <i>VMD00XX: Emission Reductions from CO₂ Capture from Oil and Gas Production and Processing;</i> or ○ The capture of CO₂ from biomass combustion as defined in <i>VMD00XX: Emission Reductions or Removals from CO₂ Capture from Bioenergy Combustion</i> and the capture of CO₂ from biofuel production processes (e.g., biogas or ethanol production) as defined in <i>VMD00XX: Emission Reductions or Removals from CO₂ Capture from Bioproduction Processes</i> ○ The capture of CO₂ from pre-combustion process in power and heat generation as defined in <i>VMD00XX: Emission Reductions from CO₂ Capture from Precombustion Processes in Fossil Fuel Power and Heat Generation</i> ○ The capture of CO₂ from oxy-fuel combustion in power and heat generation as defined in <i>VMD00XX: Emission Reductions from CO₂ Capture from Oxyfuel Combustion in Fossil Fuel Power and Heat Generation</i> 	
<p>3. Under this methodology, only CO₂ streams captured using the following activities are applicable to generate carbon dioxide removals:</p> <ul style="list-style-type: none"> ○ Project activities must capture atmospheric CO₂ from ambient air. ○ The project activity must capture biogenic CO₂ originating from sustainable biomass that follows the sustainability principles set in the Appendix 2 of the latest version of <i>Differentiating Reductions and Removals in CCS Projects</i> 	<p>The applicability condition is written in a clear and concise manner, ensuring a project adheres to the condition and that conformance can be demonstrated at the time of project validation. However, the tool for Differentiating Reductions and Removals in CCS Projects has not been submitted for assessment and will have to be assessed for conformance when it is reviewed.</p>
<p>4. The eligible transport activities include intermediate storage facilities and transport by pipeline,</p>	<p>The probability of conformance with the applicability condition cannot be</p>

Applicability Condition	Assessment
<p>ship/barge, rail, and trucks as defined in <i>VMD00XX: Project Emissions from CO₂ Transport for CCS Projects</i>.</p>	<p>determined at this time. The module has not been evaluated. The probability of conformance will have to be evaluated when the module is being assessed.</p>
<p>5. The eligible storage activities as defined in <i>VMD0058: Project Emissions from CO₂ Storage in Saline Aquifers and Depleted Hydrocarbon Reservoirs</i>.</p>	<p>The probability of conformance with the applicability condition cannot be determined at this time. The module has not been evaluated. The probability of conformance will have to be evaluated when the modules are being assessed.</p>
<p>6. The capture facility must be designed to handle a CO₂ stream delivered to the storage site that meets the following requirements:</p> <ul style="list-style-type: none"> ○ A minimum concentration of 95% purity or ○ complies with the applicable regulations of the national/regional/local project jurisdiction related to CO₂ purity and the concentration of co-injected substances. 	<p>The applicability condition is written in a clear and concise manner, ensuring a project adheres to the condition and that conformance can be demonstrated at the time of project validation.</p>
<p>7. Projects must adhere to all applicable regulations of the national/regional/local project jurisdiction related to the capture, transport, and storage of CO₂.</p>	<p>The applicability condition is written in a clear and concise manner, ensuring a project adheres to the condition and that conformance can be demonstrated at the time of project validation.</p>
<p>8. Where the project facilities include refrigeration systems that utilize industrial refrigerants, they must:</p> <ul style="list-style-type: none"> ○ Only use refrigerants that are not controlled substances under the Montreal Protocol (e.g., HCFCs) or under the Kigali Amendment (e.g., HFCs); ○ Ensure that the refrigerants comply with the most conservative (stringent) applicable regulations of the country/region where the equipment is installed. This means: 	<p>The applicability condition is written in a clear and concise manner, ensuring a project adheres to the condition and that conformance can be demonstrated at the time of project validation.</p>

Applicability Condition	Assessment
<p>In cases where the country's regulations are less stringent (i.e., allow Global Warming Potential (GWP) of refrigerants higher than 5), refrigerants with a GWP below 5 are required to be used to minimize environmental impact</p>	

The methodology is not applicable for the following project activities that:

Project Activity	Assessment
<p>9. Utilize captured CO₂ as a feedstock for products or services (i.e., carbon capture and utilization);</p>	<p>It is appropriate that this activity be considered not applicable for this methodology. This process and technology is already under development and implementation in the public sector</p>
<p>10. Capture and store CO₂ through enhanced weathering, carbon mineralization, biochar production, or ocean alkalinity enhancement;</p>	<p>It is appropriate that this activity be considered not applicable for this methodology. These processes can be large scale natural processes except biochar. It would be difficult to adequately develop a baseline for these processes.</p>
<p>11. Divert CO₂ streams from other storage or utilization activities;</p>	<p>It is appropriate that this activity be considered not applicable for this methodology. The activity is already available in the commercial market.</p>
<p>12. Produce CO₂ for the purpose of capturing it;</p>	<p>It is appropriate that this activity be considered not applicable for this methodology. This activity would constitute 'gaming the system'.</p>
<p>13. Extract CO₂ from a geologic formation to generate credits or</p>	<p>It is appropriate that this activity be considered not applicable for this methodology. This activity would emit already captured CO₂, defeating the purpose of this methodology.</p>
<p>14. Reduce energy-related emissions from an existing CCS activity through technology improvement,</p>	<p>It is appropriate that this activity be considered not applicable for this</p>

Project Activity	Assessment
operational improvement, a shift in the mode of transportation, or a switch to less carbon-intensive energy sources	methodology. This methodology is intended for new projects.

3.6 Project Boundary

The VCS Standard requires the methodology establish criteria and procedures for describing the project boundary and identifying the sources, sinks, and reservoirs relevant to the baseline and project scenarios. The methodology provides a clear diagram (Figure 1) and Table 1 provides a detailed description of the sources, sinks and reservoirs. The assessment team’s comments are included below:

For the baseline:

Baseline	Gas	Included?	Justification/Explanation	Assessment Comments
CO ₂ source facilities or the atmosphere	CO ₂	Yes	CO ₂ captured and injected	This is the main project activity. The concentration of CO ₂ is about 95%.
	CH ₄	No	Only CO ₂ is included. This is conservative.	It is appropriate to exclude this gas. The concentration is much lower than CO ₂ .
	N ₂ O	No	Only CO ₂ is included. This is conservative.	It is appropriate to exclude this gas. The concentration is much lower than CO ₂ .
	Other	No	Only CO ₂ is included. This is conservative.	This is an appropriate assumption.

Project	Gas	Included?	Justification/Explanation	Assessment Comments
CO ₂ capture site	CO ₂	Yes	Major source. Details are provided in each capture module.	It is appropriate to include this source and this gas to be conservative
	CH ₄	Yes	Major source. Details are provided in each capture module.	It is appropriate to include this source and this gas to be conservative
	N ₂ O	Yes	Major source. Details are provided in each capture module.	It is appropriate to include this source and this gas to be conservative
	Other	No	Negligible	This is an appropriate assumption. The above gases are the main gases of interest.
CO ₂ transport facility	CO ₂	Yes	Major source. Details are provided in each transport module.	It is appropriate to include this source and this gas to be conservative
	CH ₄	Yes	Major source. Details are provided in each transport module.	It is appropriate to include this source and this gas to be conservative
	N ₂ O	Yes	Major source. Details are provided in each transport module.	It is appropriate to include this source and this gas to be conservative
	Other	No	Negligible	This is an appropriate assumption. The above gases are the main gases of interest.
	CO ₂	Yes	Major source. Details are provided in each storage module.	It is appropriate to include this source and this

Project	Gas	Included?	Justification/Explanation	Assessment Comments
CO ₂ storage site				gas to be conservative
	CH ₄	Yes	Major source. Details are provided in each storage module.	It is appropriate to include this source and this gas to be conservative
	N ₂ O	Yes	Major source. Details are provided in each storage module.	It is appropriate to include this source and this gas to be conservative
	Other	No	Negligible	This is an appropriate assumption. The above gases are the main gases of interest.

3.7 Baseline Scenario

This methodology uses a project method to determine the crediting baseline. The capture modules under this framework provide the procedures and requirements for defining the baseline scenario for the relevant capture activities

The assessor reviewed this approach to the baseline requirements and confirmed the project method is appropriate for the relevant capture activity..

3.8 Additionality

This methodology uses the project method to assess additionality. Following the requirements of the standard, the methodology uses the CDM Tool for the Demonstration of Additionality. As the first carbon capture and storage methodology, it is appropriate to use the CDM Tool to determine additionality. Use of a standard method would not be possible because there are no projects under this methodology and no market to complete a market assessment potential. The methodology developer provides additional guidance for using the CDM Tool. The assessor reviewed these additionality methods and requirements and confirmed the project method and use of the CDM Tool is appropriate.

3.9 Quantification of GHG Emission Reductions and Carbon Dioxide Removals

3.9.1 Baseline Emissions

The methodology approach for quantification of baseline GHG emissions uses common industrial practices for flow measurement. The procedures for calculating baseline emissions cover all GHG sources, sinks and reservoirs included in the project boundary.

- All equations and formulae used are appropriate and without error. Through review of the quantification requirements, the assessment team found issues/errors in equations, etc., were corrected throughout the process enough to reasonably assure the assessment team that the resulting baseline calculations of the methodology were appropriate and without error.
- All default factors used are appropriate and in conformance with VCS Program requirements or same. The assessment team noted default factors in subject findings, and through the methodology assessment process, the default factors were considered appropriate for the methodology.

Through detailed review during the methodology assessment process, the assessment team can confirm with reasonable assurance that all procedures for estimating the baseline emissions are appropriate and without error.

3.9.2 Project Emissions

The standard equation for project emissions is provided in Section 8.2 and is appropriate. The detailed calculation methods will be described in the appropriate modules chosen by the project proponent. The project emissions methods will be assessed during the assessment of each module and documented in the module assessment report.

3.9.3 Leakage Emissions

The standard equation for leakage emissions is provided in Section 8.3 and is appropriate. The detailed calculation methods will be described in the appropriate modules chosen by the project proponent. The leakage emissions methods will be assessed during the assessment of each module and documented in the module assessment report.

3.9.4 GHG Emission Reductions and Carbon Dioxide Removals

The standard equation for GHG emissions reductions or CO₂ removals is provided in Section 8.4 and is appropriate. If a project achieves both reductions and removals, then they must use the *Tool for Differentiating Reductions and Removals in CCS Projects* accordingly, which is yet to be assessed. Other detailed calculation methods supporting

the GHG emissions reductions and carbon dioxide removals will be described in the appropriate modules chosen by the project proponent. The supporting calculations methods will be assessed during the assessment of each module and documented in the module assessment report.

3.9.5 Uncertainty

This methodology allows project proponents to develop projects using a combination of capture, transportation and storage activities. Each activity will have a different level of uncertainty, inherent or other. Each project activity must assess uncertainty as outlined in the relevant modules and defined in the methodology. The assessment of uncertainty associated with the project quantification is necessary to provide a conservative approach to quantification. This step will assess if an uncertainty deduction is required.

The assessment team confirmed this is a conservative approach to estimating emission reductions and carbon dioxide removals. The VVB assessed and confirms that this approach to determining uncertainty is appropriate.

3.10 Monitoring, Data and Parameters

The following are the data, parameters, and procedures available at validation. Through review of all data/parameters at validation, the assessment team confirms with reasonable assurance that they are appropriate for the project activities covered by the methodology.

Data/Parameter	Assessment Team Findings
T_{STP}	This is the temperature at standard conditions. It is used in the calculation of the baseline CO ₂ flow to determine the quantity of CO ₂ used as the baseline
P_{STP}	This is the pressure at standard conditions. It is used in the calculation of the baseline CO ₂ flow to determine the quantity of CO ₂ used as the baseline
$\rho_{CO_2x(STP)}$	This is the density of CO ₂ at standard conditions. It is used in the calculation of the baseline CO ₂ flow to determine the quantity of CO ₂ used as the baseline
M_{CO_2}	Molar mass of CO ₂ , a physical constant
$t_{\alpha=10\%}$	t-value for two-sided 90% confidence interval, 1.6449
$t_{\alpha=90\%}$	t-value for a one-sided 66.67% confidence interval, 0.4307

The following are data, parameters and procedures that will be monitored during the monitoring period.

Data/Parameter	Assessment Team Findings
T_x	This is actual temperature of the CO ₂ flow at operating conditions. It is used in the calculation of the baseline CO ₂ flow to determine the quantity of CO ₂ used as the baseline.
$Q_{CO_2,injected,i,y}$	This is the mass of CO ₂ injected at a specific monitoring point. It is used in the calculation of the baseline CO ₂ injected at the storage site(s).
$Q_{CO_2,non-VCS,injected,i,y}$	This is the mass of CO ₂ injected at a specific monitoring point that considered non-VCS CO ₂ . It is used in the calculation of the baseline CO ₂ injected at the storage site.
P_x	This is the actual pressure of the CO ₂ flow at operating conditions.
$FR_{mass,x}$	This is the total mass of CO ₂ through a specific flow meter during the monitoring period.
X_{CO_2}	This is the mole fraction of CO ₂ at a specific flow meter
X_k	Mole fraction of component K at flow meter x
M_k	Molar mass of component K
$FR_{vol,x(P,T)}$	This is the total volume of gas at standard temperature and pressure
$\rho_{CO_2x(P,T)}$	The density of CO ₂ at standard temperature and pressure

Through review of all data/parameters to be monitored, the assessment team confirms with reasonable assurance they are appropriate for the project activities covered by the methodology. The assessment team concludes the monitoring plan ensures that these elements of GHG emission reductions and removals are monitored and reported appropriately and the data/parameters and procedures for monitoring are in line with VCS rules.

3.11 Verifiable

After completion of the full methodology assessment, the assessment team confirms with reasonable assurance that the methodology is sufficiently clear and specific to require project developers to transparently report project results in combination with appropriate modules that can pass validation and verification audits with high confidence.

4 ASSESSMENT CONCLUSION

Aster Global Environmental Solutions, Inc., has completed the methodology assessment of *VM0049 Carbon Capture and Storage*. The assessment team confirms the methodology adheres to the criteria established for this methodology assessment, which are documented and complete. Aster Global concludes without any qualifications or limiting conditions that the methodology documentation meets the requirements of the VCS Program Guide, VCS Methodology Requirements, and the VCS Methodology Development

and Review Process. Therefore, Aster Global recommends that Verra approve the methodology *VM0049 Carbon Capture and Storage (CCS)*. as prepared by Perspective Climate Group.

5 EVIDENCE OF FULFILMENT OF VVB ELIGIBILITY REQUIREMENTS

This is the first methodology in Sectoral Scope 16 Carbon Capture and Storage. There are no registered Carbon Capture and Storage projects in the Verra pipeline. Aster Global has requested accreditation for scope expansion with ANAB for Sector Scope 16, Carbon capture and storage (ANAB 4).

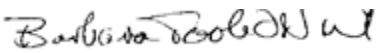
Aster Global fulfills the eligibility requirements for validation/verification bodies as the assessor for this methodology in the following ways:

- Aster Global and/or the Lead Assessor has assessed at least 28 methodologies
- Aster Global has one standard methods experts on staff,
- Aster Global staff are experienced assessors including a power and energy generation expert

6 SIGNATURE

Signed for and on behalf of:

Name of entity: Aster Global Environmental Solutions, Inc.

Signature: 

Name of Lead Assessor: Barbara Toole O'Neil

Signature: 

Name of signatory: Janice McMahon_

Date: 26 June 2024

7 APPENDIX A: LIST OF DOCUMENTS RECEIVED FROM CLIENT

Document Name	Date Received
20231122-Batch 1_Documentation summary.pptx	11/22/2023
22025.00 - Carbon Capture Storage+ Findings Document 20Dec2023_GK.docx	1/11/2024
22025.00 - Carbon Capture Storage+ Findings Document 20Dec2023_GK.docx	2/2/2024
22025.00 - Carbon Capture Storage+ Findings Document 2February2024.docx	3/5/2024
22025.00 - CCS Meth - Checklist - Round 2 Findings - 2024-04-18.xlsx	5/13/2024
22025.00 - CCS Meth - Public Comments - Round 2 Findings - 2024-04-18.xlsx	5/13/2024
22025.00 - DAC - Checklist - Round 2 Findings - 2024-04-18.xlsx	5/15/2024
22025.00 - DAC - Public Comments - Round 2 Findings - 2024-05-03.xlsx	5/15/2024
22025.00 Docs List Index.xlsx	6/5/2024
22025.00_VCS methodologyassessment_propV5-03242022_PCG.pdf	4/2/2022
220250_1.DOC	1/25/2024
Aquifers Storage Module - Public Consultation_clean.docx	11/22/2023
Aquifers Storage Module - Public Consultation_clean.docx	4/19/2024
Aquifers Storage Module - Public Consultation_TC.docx	11/17/2023
Aquifers-Storage-Module-Public-Consultation-Draft.pdf	6/5/2024
CCS Methodology - Public Consultation_clean.docx	11/22/2023
CCS Methodology - Public Consultation_TC.docx	12/12/2023
CCS Methodology.docx	1/11/2024
CCS Methodology.docx	1/25/2024
CCS Methodology.docx	2/2/2024
CCS Methodology.docx	3/11/2024
CCS Methodology_04042024.docx	4/9/2024
CCS Methodology_05052024.docx	5/13/2024
CCS Methodology_18032024.docx	3/21/2024
CCS Methodology_22052024 - Clean.docx	5/23/2024
CCS Methodology_22052024 - TC.docx	5/23/2024
CCS Methodology_24052024 - clean.docx	5/24/2024
CCS Methodology_24052024 - TC.docx	5/24/2024
CCS Methodology_27032024.docx	3/28/2024
CCS Methodology_27052024 - Clean.docx	5/27/2024
CCS Methodology-Road Map.xlsx	1/19/2024
CCS Methodology-Road Map.xlsx	2/2/2024
CCS+ Figures.pptx	3/5/2024
CCS+ Initiative .pptx	11/14/2023
CCS+-internal Public Consultation Template.xlsx	11/17/2023
CCS+-internal Public Consultation Template_20240405.xlsx	4/8/2024
CCS-Methodology-Public-Consultation-Draft.pdf	7/13/2023

DAC Module - Public Consultation_clean.docx	11/22/2023
DAC Module - Public Consultation_TC.docx	11/17/2023
DAC Module.docx	1/11/2024
DAC Module.docx	1/25/2024
DAC Module.docx	2/2/2024
DAC Module.docx	3/5/2024
DAC Module_04042024.docx	4/9/2024
DAC Module_04042024.docx	4/19/2024
DAC Module_05052024.docx	5/15/2024
DAC Module_18032024.docx	3/21/2024
DAC Module_27032024.docx	3/28/2024
DAC-Module-Public-Consultation-Draft.pdf	7/13/2023
Draft-PC-document-CCS-Methodology.pdf	7/13/2023
Example calculation - Batch 1.xlsx	11/27/2023
FAR Responses.pdf	12/11/2023
Fw_22025.00 Update.zip	11/17/2023
GCS-Non-Permanence-Risk-Tool-v4.0-FINAL.pdf	7/13/2023
GCS-Requirements-v4.0-FINAL.pdf	7/13/2023
Graphic schedule from CCS+ Feb2023.docx	4/13/2023
Methodology for Carbon Capture and Storage.docx	2/28/2024
Module for CO2 Capture from Air (Direct Air Capture).docx	12/11/2023
Module for CO2 Storage in Saline Aquifers.docx	12/11/2023
Module for CO2 Transport.docx	12/11/2023
MRR_CCS Methodology and Modules_Batch1.pdf	11/22/2023
MRR_CCS Methodology and Modules_Batch1_Responses June 26.pdf	11/13/2023
Re_22025.00 CCS+ update and questions (1).zip	1/11/2024
Specific Questions_VVB.docx	3/21/2024
Storage Module.docx	1/11/2024
Storage Module.docx	2/2/2024
Summary of comments Aug2023.pdf	8/27/2023
Transport Module - Public Consultation_clean.docx	11/22/2023
Transport Module - Public Consultation_TC.docx	11/17/2023
Transport Module.docx	1/11/2024
Transport Module.docx	1/25/2024
Transport Module.docx	2/2/2024
Transport Module.docx	3/6/2024
Transport Module.docx	4/19/2024
Transport-Module-Public-Consultation-Draft.pdf	7/13/2023
Uncertainty assessment - Batch 1_v2.xlsx	4/10/2024
Uncertainty assessment - Batch 1_v3.xlsx	5/13/2024

8 APPENDIX B: FINDINGS

Item	1
Methodology Development and Review Process 04 October 2023, v4.3 (Section)	6.1.3
Methodology Development and Review Process 04 October 2023, v4.3 (Description)	3) Structure and clarity of methodology: Assessment of whether the methodology is written in a clear, logical, concise, and precise manner that will enable project developers to consistently implement projects and transparently report project results;
Evidence Used to Assess (Location in Meth/Module or Supporting Documents)	CCS+ Methodology Framework
Aster Global Findings - Round 1	The methodology is not using the latest version of the Methodology Template v4.3 published by Verra.
Round 1 NCR/CL/OFI	NCR: Please bring the methodology in line with the finding.
Round 1 Response from Development Team	The methodology has been updated based on the current template.
Aster Global Findings - Round 2	Closed, but could be reopened if Verra updates templates.

Item	2
Methodology Development and Review Process 04 October 2023, v4.3 (Section)	6.1.3
Methodology Development and Review Process 04 October 2023, v4.3 (Description)	3) Structure and clarity of methodology: Assessment of whether the methodology is written in a clear, logical, concise, and precise manner that will enable project developers to consistently implement projects and transparently report project results;
Evidence Used to Assess (Location in Meth/Module or Supporting Documents)	CCS+ Methodology Framework: Table of Contents
Aster Global Findings - Round 1	It is unclear to the assessment team why the table of contents structure does not match format in v4.3 of the Methodology Template.
Round 1 NCR/CL/OFI	CL: Please clarify in line with the finding.
Round 1 Response from Development Team	The table of contents structure has been revised according to the latest methodology template.
Aster Global Findings - Round 2	Latest template is being used. Finding is closed

Item	3
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Methodology Development and Review Process 04 October 2023, v4.3 (Section)	6.1.3
Methodology Development and Review Process 04 October 2023, v4.3 (Description)	3) Structure and clarity of methodology: Assessment of whether the methodology is written in a clear, logical, concise, and precise manner that will enable project developers to consistently implement projects and transparently report project results;
Evidence Used to Assess (Location in Meth/Module or Supporting Documents)	CCS+ Methodology Framework: Project Boundary Figures
Aster Global Findings - Round 1	It is unclear to the assessment team why the Figure titles and descriptions are located below the figures themselves.
Round 1 NCR/CL/OFI	CL: Please clarify in line with the finding.
Round 1 Response from Development Team	All figure titles have been placed above the corresponding figures.
Aster Global Findings - Round 2	Finding is closed.

Item	4
Methodology Development and Review Process 04 October 2023, v4.3 (Section)	6.1.3
Methodology Development and Review Process 04 October 2023, v4.3 (Description)	16) Verifiable: Whether the methodology is sufficiently clear and specific to require project developers to transparently report project results that can pass validation and verification with high confidence.
Evidence Used to Assess (Location in Meth/Module or Supporting Documents)	CCS+ Methodology Framework
Aster Global Findings - Round 1	It is unclear to the assessment team how the modules and tools referred to in the methodology framework document fit together. Please clarify the framework with a methodology roadmap or update the methodology to provide more clarity.
Round 1 NCR/CL/OFI	CL: Please clarify in line with the finding.
Round 1 Response from Development Team	A road map that explains the modular structure of the methodology and summary of the modules have been provided.
Aster Global Findings - Round 2	Wording of applicability conditions, project boundary, and description of the monitoring plan have been updated to provide clarity on how modules/tools must be used within the framework. Finding is closed.

Item	5
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Methodology Development and Review Process 04 October 2023, v4.3 (Section)	6.1.3
Methodology Development and Review Process 04 October 2023, v4.3 (Description)	12) Estimated GHG emission reductions and removals: Assessment of whether the approach for calculating the GHG emission reductions and carbon dioxide removals of the project is appropriate, adequate, conservative and in conformance with VCS Program rules and requirements;
Evidence Used to Assess (Location in Meth/Module or Supporting Documents)	CCS+ Methodology Framework: Section 2: Summary Description of the Methodology, Applicability conditions
Aster Global Findings - Round 1	It is unclear to the assessment team how the procedures/criteria that quantify GHG emission reductions from the project activities are properly described in the methodology.
Round 1 NCR/CL/OFI	CL: Please clarify in line with the finding.
Round 1 Response from Development Team	Roadmap will be added to the appendix of the methodology after approved by the VVB to clarify the procedures set out in the respective modules.
Aster Global Findings - Round 2	Applicability conditions were updated and are clearly lay out how a project can achieve carbon dioxide removals. Finding is closed.

Item	6
Methodology Development and Review Process 04 October 2023, v4.3 (Section)	6.1.3
Methodology Development and Review Process 04 October 2023, v4.3 (Description)	3) Structure and clarity of methodology: Assessment of whether the methodology is written in a clear, logical, concise, and precise manner that will enable project developers to consistently implement projects and transparently report project results;
Evidence Used to Assess (Location in Meth/Module or Supporting Documents)	CCS+ Methodology Framework: Sources, Applicability conditions
Aster Global Findings - Round 1	It is unclear to the assessment team how the development of new modules (without VCS approved numbers and names i.e. VMD00XX), will be handled when the methodology is published. Please clarify why specific names were used, as opposed to a VCS list that could be updated as new modules are approved.
Round 1 NCR/CL/OFI	CL: Please clarify in line with the finding.
Round 1 Response from Development Team	The decision to specify module names was made to provide clear guidance on what constitutes eligible activities for this methodology. By explicitly naming the modules, we aim to ensure that project proponents are aware of the precise requirements and applicable modules for their activities.

Aster Global Findings Round 2	- Finalized names and numbers will be provided by verra prior to publication. Finding is closed.
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Item	7
Methodology Development and Review Process 04 October 2023, v4.3 (Section)	6.1.3
Methodology Development and Review Process 04 October 2023, v4.3 (Description)	5) Applicability conditions: Assessment of whether the proposed methodology's applicability conditions are appropriate, adequate, and in conformance with VCS Program rules and requirements;
Evidence Used to Assess (Location in Meth/Module or Supporting Documents)	CCS+ Methodology Framework: Section 4: Applicability Conditions
Aster Global Findings Round 1	- It is unclear to the assessment team what the wording in applicability condition #5 is requiring, specifically, the phrase "whichever is stringent."
Round 1 NCR/CL/OFI	CL: Please clarify in line with the finding.
Round 1 Response from Development Team	In item 6, "stringent" term has been removed and criteria has been revised. In item 8, "stringent" refers to the refers to regulations that are more conservative. Applicability conditions are revised for further clarity.
Aster Global Findings Round 2	- Text has been updated. Finding is closed

Item	8
Methodology Development and Review Process 04 October 2023, v4.3 (Section)	6.1.3
Methodology Development and Review Process 04 October 2023, v4.3 (Description)	5) Applicability conditions: Assessment of whether the proposed methodology's applicability conditions are appropriate, adequate, and in conformance with VCS Program rules and requirements;
Evidence Used to Assess (Location in Meth/Module or Supporting Documents)	CCS+ Methodology Framework: Section 4: Applicability Conditions
Aster Global Findings Round 1	- It is unclear to the assessment team why the applicability conditions formatting is not in line with the VCS Methodology Template 4.3
Round 1 NCR/CL/OFI	NCR: Please bring the methodology in line with the finding.
Round 1 Response from Development Team	It has been revised accordingly.
Aster Global Findings Round 2	- Text has been updated. Finding is closed

Item	9
Methodology Development and Review Process 04 October 2023, v4.3 (Section)	6.1.3
Methodology Development and Review Process 04 October 2023, v4.3 (Description)	5) Applicability conditions: Assessment of whether the proposed methodology's applicability conditions are appropriate, adequate, and in conformance with VCS Program rules and requirements;
Evidence Used to Assess (Location in Meth/Module or Supporting Documents)	CCS+ Methodology Framework: Section 4: Applicability Conditions
Aster Global Findings - Round 1	It is unclear to the assessment team how list of conditions in condition #2 align with the last two bullets in Section 4.
Round 1 NCR/CL/OFI	CL: Please clarify in line with the finding.
Round 1 Response from Development Team	The last two bullet points have now been included under Condition 3 to better clarify the criteria to generate Carbon Dioxide removals.
Aster Global Findings - Round 2	Text has been updated. Finding is closed

Item	10
Methodology Development and Review Process 04 October 2023, v4.3 (Section)	6.1.3
Methodology Development and Review Process 04 October 2023, v4.3 (Description)	11) Leakage emissions: Assessment of whether the approach for calculating leakage is appropriate, adequate, and in conformance with VCS Program rules and requirements;
Evidence Used to Assess (Location in Meth/Module or Supporting Documents)	CCS+ Methodology Framework: Materiality threshold subheading.
Aster Global Findings - Round 1	It is unclear to the assessment team how the 2% materiality threshold is intended to be implemented by the project proponent in relation to the leakage calculations in the modules. Specifically, some leakage sources seem optional, so how does that affect the total materiality threshold?
Round 1 NCR/CL/OFI	CL: Please clarify in line with the finding.

<p>Round 1 Response from Development Team</p>	<p>The 2% materiality threshold is applied to determine which leakage emissions should be included in the GHG quantification. A leakage source is included in the quantification if it is estimated to be over 2% of the net project emission reductions and Carbon Dioxide removals over the anticipated typical project lifetime. At the same time it was ensured that the total excluded leakage emissions do not exceed the 2% threshold. This threshold helps in identifying significant leakage sources while allowing for the exclusion of minor ones to simplify the calculation process. The document also lists specific leakage sources that are typically excluded, such as the production and transport of equipment and materials for construction, and staff commuting. It's important to note that the methodology prescribes specific leakage sources to be excluded, such as emissions from the production and transport of construction materials and staff commuting. To address your point about optional leakage sources, the methodology provides which emissions sources are considered material and should be included. This is determined based on the justification provided in the methodology for the materiality threshold, and it is not the responsibility of the project proponent to conduct materiality checks for each project activity.</p>
<p>Aster Global Findings Round 2</p>	<p>- Text has been modified to be more clear, and moved to the appendix. Finding is closed</p>

<p>Item</p>	<p>11</p>
<p>Methodology Development and Review Process 04 October 2023, v4.3 (Section)</p>	<p>6.1.3</p>
<p>Methodology Development and Review Process 04 October 2023, v4.3 (Description)</p>	<p>9) Baseline emissions: Assessment of whether the approach for calculating baseline emissions is appropriate, adequate, and in conformance with VCS Program rules and requirements;</p>
<p>Evidence Used to Assess (Location in Meth/Module or Supporting Documents)</p>	<p>CCS+ Methodology Framework: Section 6: Eligible Baseline Scenarios, first two bullets in the section</p>
<p>Aster Global Findings Round 1</p>	<p>- It is unclear to the assessment team if a baseline scenario could capture CO2 from both point sources and the atmosphere in a single project activity.</p>
<p>Round 1 NCR/CL/OFI</p>	<p>CL: Please clarify in line with the finding.</p>
<p>Round 1 Response from Development Team</p>	<p>Projects can combine capture from point sources and capture from the atmosphere with each related baseline scenario as defined by the methodology. The capture modules provide further detailed procedures and requirements for identifying and working with these baseline scenarios.</p>
<p>Aster Global Findings Round 2</p>	<p>- Text has been updated to allow for capture from the atmosphere and point sources After the findings were closed, Verra modified the methodology. These changes were driven by Verra requirements, moving guidance to the modules, updating to the current Verra style guide and to align the methodology to the ICVCM.</p>

Item	12
Methodology Development and Review Process 04 October 2023, v4.3 (Section)	6.1.3
Methodology Development and Review Process 04 October 2023, v4.3 (Description)	9) Baseline emissions: Assessment of whether the approach for calculating baseline emissions is appropriate, adequate, and in conformance with VCS Program rules and requirements;
Evidence Used to Assess (Location in Meth/Module or Supporting Documents)	CCS+ Methodology Framework: Section 6: Eligible Baseline Scenarios, last three bullets in the section
Aster Global Findings - Round 1	It is unclear to the assessment team difference between the baseline scenario (greenfield etc.) that is presented in the methodology and the baseline scenario that is presented in the DAC module. Is the baseline scenario for all capture modules or is it different for each capture module?
Round 1 NCR/CL/OFI	CL: Please clarify in line with the finding.
Round 1 Response from Development Team	The methodology has been designed to have separate capture modules based on different project types (DAC, BECCS, etc.). Therefore, each capture module contains more specific procedures for identifying the corresponding baseline scenario depending on the specific project activity.
Aster Global Findings - Round 2	Finding is closed. After the findings were closed, Verra modified the methodology. These changes were driven by Verra requirements, moving guidance to the modules, updating to the current Verra style guide and to align the methodology to the ICVCM.

Item	13
Methodology Development and Review Process 04 October 2023, v4.3 (Section)	3.8.1
Methodology Development and Review Process 04 October 2023, v4.3 (Description)	12) Estimated GHG emission reductions and removals: Assessment of whether the approach for calculating the GHG emission reductions and carbon dioxide removals of the project is appropriate, adequate, conservative and in conformance with VCS Program rules and requirements;
Evidence Used to Assess (Location in Meth/Module or Supporting Documents)	CCS+ Methodology Framework: Section 8: Quantification of GHG Emission Reductions and Removals
Aster Global Findings - Round 1	It is unclear to the assessment team if project activities will result in GHG emission reductions, carbon dioxide removals, or both.
Round 1 NCR/CL/OFI	CL: Please clarify in line with the finding and the requirement.

Round 1 Response from Development Team	The relevant texts have been updated according to the Methodology Requirements.
Aster Global Findings - Round 2	Text has been modified. Finding is closed.

Item	14
Methodology Development and Review Process 04 October 2023, v4.3 (Section)	6.1.3
Methodology Development and Review Process 04 October 2023, v4.3 (Description)	3) Structure and clarity of methodology: Assessment of whether the methodology is written in a clear, logical, concise, and precise manner that will enable project developers to consistently implement projects and transparently report project results;
Evidence Used to Assess (Location in Meth/Module or Supporting Documents)	CCS+ Methodology Framework: Section 8.1: Baseline Emissions. Variable Q_CO2,injected,i,y
Aster Global Findings - Round 1	For the referenced variable, it is unclear how the mass of CO2 at the injection point is related to the DAC and BECCS capture modules.
Round 1 NCR/CL/OFI	CL: Please clarify in line with the finding.
Round 1 Response from Development Team	The mass of CO2 at the injection point is used to determine baseline emissions for the project activity. Specifically, for DAC and BECCS, the mass of CO2 at the injection point refers to the CO2 that would have remained in the atmosphere if it had not been captured. In the case of DAC, this is the atmospheric CO2 directly captured from the air. For BECCS, it includes the CO2 resulting from the combustion of biomass or the processing of biomass into biofuels. The methodology considers these components for the calculation of baseline emissions, ensuring that all relevant forms of CO2 captured are accounted for in the total mass of CO2 injected at the storage site.
Aster Global Findings - Round 2	Text has been modified. Finding is closed.

Item	15
Methodology Development and Review Process 04 October 2023, v4.3 (Section)	6.1.3
Methodology Development and Review Process 04 October 2023, v4.3 (Description)	3) Structure and clarity of methodology: Assessment of whether the methodology is written in a clear, logical, concise, and precise manner that will enable project developers to consistently implement projects and transparently report project results;
Evidence Used to Assess (Location in Meth/Module or Supporting Documents)	CCS+ Methodology Framework: p.3 Section 1: Sources

Aster Global Findings - Round 1	It is unclear to the assessment team how unconfirmed names will be handled in the final version of the methodology, and typically final versions will be listed by number in the methodology.
Round 1 NCR/CL/OFI	CL: Please clarify in line with the finding.
Round 1 Response from Development Team	The names of the latest versions of the modules and tools have been included. As per the clarification from VERRA the methodologies team will assign the numbers to the documents at the end of the process and then update all documents.
Aster Global Findings - Round 2	Finalized names and numbers will be provided by verra prior to publication. Finding is closed.

Item	16
Methodology Development and Review Process 04 October 2023, v4.3 (Section)	6.1.3
Methodology Development and Review Process 04 October 2023, v4.3 (Description)	3) Structure and clarity of methodology: Assessment of whether the methodology is written in a clear, logical, concise, and precise manner that will enable project developers to consistently implement projects and transparently report project results; 12) Estimated GHG emission reductions and removals: Assessment of whether the approach for calculating the GHG emission reductions and carbon dioxide removals of the project is appropriate, adequate, conservative and in conformance with VCS Program rules and requirements;
Evidence Used to Assess (Location in Meth/Module or Supporting Documents)	CCS+ Methodology Framework: p.4
Aster Global Findings - Round 1	It is unclear to the assessment team why other modules are listed in the methodology, but not on p.4. Also please confirm the status of VMT00XX: Tool for Baseline Quantification and Allocation of Project Emissions in Projects with VCS and non-VCS-CO2 flows in Carbon Capture and Storage Projects. VMD00XX: Differentiation between emission reductions and removals in Carbon Capture and Storage Projects
Round 1 NCR/CL/OFI	CL: Please clarify in line with the finding.
Round 1 Response from Development Team	Verra has initiated a public consultation on draft versions of tools and modules.[1]
Aster Global Findings - Round 2	Finding is closed.

Item	17
Methodology Development and Review Process 04 October 2023, v4.3 (Section)	6.1.3

Methodology Development and Review Process 04 October 2023, v4.3 (Description)	3) Structure and clarity of methodology: Assessment of whether the methodology is written in a clear, logical, concise, and precise manner that will enable project developers to consistently implement projects and transparently report project results;
Evidence Used to Assess (Location in Meth/Module or Supporting Documents)	CCS+ Methodology Framework: p.5
Aster Global Findings - Round 1	- It is unclear to the assessment team if there will be more VCS Program requirements specifically for CCS.
Round 1 NCR/CL/OFI	CL: Please clarify in line with the finding.
Round 1 Response from Development Team	In the current situation, VERRA only has two main guidance documents related to the CCS projects (Geologic Carbon Storage Requirements and GCS Non-Permanence Risk Tool). Projects must comply with the requirements outlined in these two documents. Furthermore, if VERRA publishes any additional requirements for CCS projects in the future, the methodology will be revised accordingly.
Aster Global Findings - Round 2	- Finding is closed.

Item	18
Methodology Development and Review Process 04 October 2023, v4.3 (Section)	6.1.3
Methodology Development and Review Process 04 October 2023, v4.3 (Description)	3) Structure and clarity of methodology: Assessment of whether the methodology is written in a clear, logical, concise, and precise manner that will enable project developers to consistently implement projects and transparently report project results;
Evidence Used to Assess (Location in Meth/Module or Supporting Documents)	CCS+ Methodology Framework: Section 2: Additionality.
Aster Global Findings - Round 1	- It is unclear to the assessment team why a project method for additionality was chosen for this methodology.
Round 1 NCR/CL/OFI	CL: Please clarify in line with the finding.

<p>Round 1 Response from Development Team</p>	<p>The choice of the Project Method for assessing additionality is grounded in several considerations unique to the CCS project landscape. Here is a detailed explanation:</p> <ul style="list-style-type: none"> · Complex Regulatory and Operational Environments: CCS projects are subject to a diverse array of legal, technological, and market conditions that vary significantly across jurisdictions. The Project Method's tailored approach allows for an in-depth and conservative examination of these factors on a project-by-project basis, ensuring that assessments of regulatory surplus and specific implementation barriers are accurately discussed. · Investment Barriers: Given the high capital requirements, technological uncertainties, and potential for variable financial returns associated with CCS projects, demonstrating investment barriers is a central component of establishing additionality. The Project Method effectively addresses this by incorporating detailed investment analysis tools, enabling a nuanced evaluation of the financial viability and specific economic challenges faced by CCS projects. · Technology-Specific Considerations: The range of technologies involved in CCS, each with different levels of maturity and implementation challenges, necessitates a method that can accommodate such variability. The Project Method allows for the consideration of technology-specific factors, including performance, integration complexity, and scalability, which are vital for assessing the additionality of CCS projects. · Sectoral and Geographical Variability: CCS encompasses a broad spectrum of activities across various sectors and regions, each with its distinct attributes and challenges. The flexibility of the Project Method in evaluating additionality for different capture activities, sectors, and geographical contexts ensures that the unique aspects of various CCS applications are adequately considered. · Dynamic Market Conditions: The evolving nature of policies, technologies, and market dynamics impacting the CCS sector requires an additionality assessment approach that can adapt to changing conditions. The Project Method's structured yet flexible framework facilitates the incorporation of the most current and relevant data, reflecting the dynamic environment in which CCS projects operate. <p>This method ensures a thorough, accurate, adaptable and conservative assessment of additionality</p>
<p>Aster Global Findings - Round 2</p>	<p>Finding is closed. Appendix has been added with this justification.</p>

<p>Item</p>	<p>19</p>
<p>Methodology Development and Review Process 04 October 2023, v4.3 (Section)</p>	<p>6.1.3</p>
<p>Methodology Development and Review Process 04 October 2023, v4.3 (Description)</p>	<p>4) Definitions: Assessment of whether the key terms in the methodology are defined clearly and appropriately and are used consistently in the methodology;</p>
<p>Evidence Used to Assess (Location in Meth/Module or Supporting Documents)</p>	<p>CCS+ Methodology Framework: Definitions</p>

Aster Global Findings Round 1	- It is unclear to the assessment team if the definition for Atmospheric CO2 is appropriately defined, please clarify the source of the definition. EPA.gov?
Round 1 NCR/CL/OFI	CL: Please clarify in line with the finding.
Round 1 Response from Development Team	Atmospheric Carbon dioxide definition[2] has been revised accordingly.
Aster Global Findings Round 2	- Text has been updated. Finding is closed. - After the findings were closed, Verra modified the methodology. These changes were driven by Verra requirements, moving guidance to the modules, updating to the current Verra style guide and to align the methodology to the ICVCM.

Item	20
Methodology Development and Review Process 04 October 2023, v4.3 (Section)	6.1.3
Methodology Development and Review Process 04 October 2023, v4.3 (Description)	4) Definitions: Assessment of whether the key terms in the methodology are defined clearly and appropriately and are used consistently in the methodology;
Evidence Used to Assess (Location in Meth/Module or Supporting Documents)	CCS+ Methodology Framework: Definitions
Aster Global Findings Round 1	- It is unclear to the assessment team what a Bioenergy plant is in context of the Bioenergy carbon capture and storage definition. Please clarify and revise.
Round 1 NCR/CL/OFI	CL: Please clarify in line with the finding.
Round 1 Response from Development Team	The Bioenergy Carbon Capture and Storage definition has been revised according to the IPCC[3] definition. Additionally, the definition of bioenergy has been added.
Aster Global Findings Round 2	- Text has been updated. Finding is closed

Item	21
Methodology Development and Review Process 04 October 2023, v4.3 (Section)	6.1.3
Methodology Development and Review Process 04 October 2023, v4.3 (Description)	4) Definitions: Assessment of whether the key terms in the methodology are defined clearly and appropriately and are used consistently in the methodology;

Evidence Used to Assess (Location in Meth/Module or Supporting Documents)	CCS+ Methodology Framework: Definitions
Aster Global Findings - Round 1	It is unclear to the assessment team if the definition for biogenic sources includes biomass.
Round 1 NCR/CL/OFI	CL: Please clarify in line with the finding.
Round 1 Response from Development Team	The definition of biomass sources has been included.
Aster Global Findings - Round 2	Definition has been added. Finding is closed

Item	22
Methodology Development and Review Process 04 October 2023, v4.3 (Section)	6.1.3
Methodology Development and Review Process 04 October 2023, v4.3 (Description)	4) Definitions: Assessment of whether the key terms in the methodology are defined clearly and appropriately and are used consistently in the methodology;
Evidence Used to Assess (Location in Meth/Module or Supporting Documents)	CCS+ Methodology Framework: Definitions
Aster Global Findings - Round 1	It is unclear to the assessment team why, within the capture facility definition, the detail 'For some industries, such as the ethanol or natural gas industry, the CO2 stream produced may be concentrated and not require separation equipment' is included in the definition. Does this detail make the definition more clear?
Round 1 NCR/CL/OFI	CL: Please clarify in line with the finding.
Round 1 Response from Development Team	The detailed has been removed and the definition has been revised.
Aster Global Findings - Round 2	Text has been updated. Finding is closed

Item	23
Methodology Development and Review Process 04 October 2023, v4.3 (Section)	6.1.3
Methodology Development and Review Process 04 October 2023, v4.3 (Description)	4) Definitions: Assessment of whether the key terms in the methodology are defined clearly and appropriately and are used consistently in the methodology;

Evidence Used to Assess (Location in Meth/Module or Supporting Documents)	CCS+ Methodology Framework: Definitions
Aster Global Findings - Round 1	It is unclear if CO2 conditioning is the actual process of treating the gas, if so what are the required conditions, e.g. temperature, pressure?
Round 1 NCR/CL/OFI	CL: Please clarify in line with the finding.
Round 1 Response from Development Team	The conditioning of CO2 gas is a process through which its properties are optimized for safe, efficient transportation, injection, and storage. Only required conditions are defined for the stored CO2 in the applicability conditions for permanent and safe storage of CO2.
Aster Global Findings - Round 2	Finding is closed.

Item	24
Methodology Development and Review Process 04 October 2023, v4.3 (Section)	6.1.3
Methodology Development and Review Process 04 October 2023, v4.3 (Description)	4) Definitions: Assessment of whether the key terms in the methodology are defined clearly and appropriately and are used consistently in the methodology;
Evidence Used to Assess (Location in Meth/Module or Supporting Documents)	CCS+ Methodology Framework: Definitions
Aster Global Findings - Round 1	For the definition of conformance, it is unclear if there is an acceptable and unacceptable degree of conformance. For example, in regulations conformance is described in terms of permit limits.
Round 1 NCR/CL/OFI	CL: Please clarify in line with the finding.
Round 1 Response from Development Team	As per the GCS requirements para 3.4.5 no conformance is defined. (https://verra.org/wp-content/uploads/2022/12/GCS-Requirements-v4.0-FINAL.pdf)
Aster Global Findings - Round 2	Finding is closed.

Item	25
Methodology Development and Review Process 04 October 2023, v4.3 (Section)	6.1.3
Methodology Development and Review Process 04 October 2023, v4.3 (Description)	4) Definitions: Assessment of whether the key terms in the methodology are defined clearly and appropriately and are used consistently in the methodology;

Evidence Used to Assess (Location in Meth/Module or Supporting Documents)	CCS+ Methodology Framework: Definitions
Aster Global Findings Round 1	- For the definition of Cryogenic process, it is unclear if a cryogenic process can create solids as well as liquids. Does a cryogenic process always lead to separation of CO2?
Round 1 NCR/CL/OFI	CL: Please clarify in line with the finding.
Round 1 Response from Development Team	The definition has been revised by generalizing it.
Aster Global Findings Round 2	- Text has been updated. Finding is closed

Item	26
Methodology Development and Review Process 04 October 2023, v4.3 (Section)	6.1.3
Methodology Development and Review Process 04 October 2023, v4.3 (Description)	4) Definitions: Assessment of whether the key terms in the methodology are defined clearly and appropriately and are used consistently in the methodology;
Evidence Used to Assess (Location in Meth/Module or Supporting Documents)	CCS+ Methodology Framework: Definitions
Aster Global Findings Round 1	- For the electrochemical process definition, it is unclear if the process always included electrodes.
Round 1 NCR/CL/OFI	CL: Please clarify in line with the finding.
Round 1 Response from Development Team	It has been revised according to the US EIA definition[4].
Aster Global Findings Round 2	- Text has been updated. Finding is closed

Item	27
Methodology Development and Review Process 04 October 2023, v4.3 (Section)	6.1.3
Methodology Development and Review Process 04 October 2023, v4.3 (Description)	4) Definitions: Assessment of whether the key terms in the methodology are defined clearly and appropriately and are used consistently in the methodology;

Evidence Used to Assess (Location in Meth/Module or Supporting Documents)	CCS+ Methodology Framework: Definitions
Aster Global Findings - Round 1	- For the definition of Flue gas, it is unclear how the definition is accurately defined. See Steam - Its Generation and Use or an appropriate government site (DOE, EPA etc.).
Round 1 NCR/CL/OFI	CL: Please clarify in line with the finding.
Round 1 Response from Development Team	The flue gas definition[5] has been revised.
Aster Global Findings - Round 2	- Text has been updated. Finding is closed

Item	28
Methodology Development and Review Process 04 October 2023, v4.3 (Section)	6.1.3
Methodology Development and Review Process 04 October 2023, v4.3 (Description)	4) Definitions: Assessment of whether the key terms in the methodology are defined clearly and appropriately and are used consistently in the methodology;
Evidence Used to Assess (Location in Meth/Module or Supporting Documents)	CCS+ Methodology Framework: Definitions
Aster Global Findings - Round 1	- For the definition of Geological Reservoir it is unclear if a gas can be injected. The definition implies only dense phase or liquid.
Round 1 NCR/CL/OFI	CL: Please clarify in line with the finding.
Round 1 Response from Development Team	The gases can be injected into a geologic reservoir. The definition has been revised accordingly.
Aster Global Findings - Round 2	- Text has been updated. Finding is closed

Item	29
Methodology Development and Review Process 04 October 2023, v4.3 (Section)	6.1.3
Methodology Development and Review Process 04 October 2023, v4.3 (Description)	4) Definitions: Assessment of whether the key terms in the methodology are defined clearly and appropriately and are used consistently in the methodology;

Evidence Used to Assess (Location in Meth/Module or Supporting Documents)	CCS+ Methodology Framework: Definitions
Aster Global Findings - Round 1	For the definition of Mandatory Monitoring Point, please clarify how the monitoring point is defined, e.g. permit, methodology?
Round 1 NCR/CL/OFI	CL: Please clarify in line with the finding.
Round 1 Response from Development Team	The requirements regarding the monitoring points have been outlined in the Storage Module. Please see Section 5.4 of the Storage Module.
Aster Global Findings - Round 2	Finding is closed.

Item	30
Methodology Development and Review Process 04 October 2023, v4.3 (Section)	6.1.3
Methodology Development and Review Process 04 October 2023, v4.3 (Description)	4) Definitions: Assessment of whether the key terms in the methodology are defined clearly and appropriately and are used consistently in the methodology;
Evidence Used to Assess (Location in Meth/Module or Supporting Documents)	CCS+ Methodology Framework: Definitions
Aster Global Findings - Round 1	For the definition of Mode of Transportation, the definition is unclear.
Round 1 NCR/CL/OFI	CL: Please clarify in line with the finding.
Round 1 Response from Development Team	The definition has been revised.
Aster Global Findings - Round 2	Text has been updated. Finding is closed. After the findings were closed, Verra modified the methodology. These changes were driven by Verra requirements, moving guidance to the modules, updating to the current Verra style guide and to align the methodology to the ICVCM.

Item	31
Methodology Development and Review Process 04 October 2023, v4.3 (Section)	6.1.3
Methodology Development and Review Process 04 October 2023, v4.3 (Description)	4) Definitions: Assessment of whether the key terms in the methodology are defined clearly and appropriately and are used consistently in the methodology;

Evidence Used to Assess (Location in Meth/Module or Supporting Documents)	CCS+ Methodology Framework: Definitions
Aster Global Findings Round 1	- For the definition of Non Condensable Gas it is unclear to the assessment team how the definition is adequate. Is there a reference for this definition, and Condensable gas is not defined.
Round 1 NCR/CL/OFI	CL: Please clarify in line with the finding.
Round 1 Response from Development Team	The condensable gas definition[6] has been included. Non-condensable definition has been revised.
Aster Global Findings Round 2	- Text has been updated. Finding is closed

Item	32
Methodology Development and Review Process 04 October 2023, v4.3 (Section)	6.1.3
Methodology Development and Review Process 04 October 2023, v4.3 (Description)	4) Definitions: Assessment of whether the key terms in the methodology are defined clearly and appropriately and are used consistently in the methodology;
Evidence Used to Assess (Location in Meth/Module or Supporting Documents)	CCS+ Methodology Framework: Definitions
Aster Global Findings Round 1	- For the definition of Oxy-Fuel combustion it is unclear how this definition is adequate.
Round 1 NCR/CL/OFI	CL: Please clarify in line with the finding.
Round 1 Response from Development Team	The definition of oxy-combustion[7] has been included.
Aster Global Findings Round 2	- Text has been updated. Finding is closed

Item	33
Methodology Development and Review Process 04 October 2023, v4.3 (Section)	6.1.3
Methodology Development and Review Process 04 October 2023, v4.3 (Description)	4) Definitions: Assessment of whether the key terms in the methodology are defined clearly and appropriately and are used consistently in the methodology;

Evidence Used to Assess (Location in Meth/Module or Supporting Documents)	CCS+ Methodology Framework: Definitions
Aster Global Findings - Round 1	For the definition of Point Source it is unclear how this definition is adequate.
Round 1 NCR/CL/OFI	CL: Please clarify in line with the finding.
Round 1 Response from Development Team	It has been revised according to the EPA definition[8].
Aster Global Findings - Round 2	Text has been updated. Finding is closed

Item	34
Methodology Development and Review Process 04 October 2023, v4.3 (Section)	6.1.3
Methodology Development and Review Process 04 October 2023, v4.3 (Description)	4) Definitions: Assessment of whether the key terms in the methodology are defined clearly and appropriately and are used consistently in the methodology;
Evidence Used to Assess (Location in Meth/Module or Supporting Documents)	CCS+ Methodology Framework: Definitions
Aster Global Findings - Round 1	For the definition of Pre-combustion capture, it is unclear to the assessment team how the definition is adequate. The current definition seems to be focused on one type of operation and is not generalized. Also, Gasification is not defined.
Round 1 NCR/CL/OFI	CL: Please clarify in line with the finding.
Round 1 Response from Development Team	The definition of pre-combustion has been generalized and the gasification definition[9] has been added.
Aster Global Findings - Round 2	Text has been updated. Finding is closed

Item	35
Methodology Development and Review Process 04 October 2023, v4.3 (Section)	6.1.3
Methodology Development and Review Process 04 October 2023, v4.3 (Description)	4) Definitions: Assessment of whether the key terms in the methodology are defined clearly and appropriately and are used consistently in the methodology;

Evidence Used to Assess (Location in Meth/Module or Supporting Documents)	CCS+ Methodology Framework: Definitions
Aster Global Findings - Round 1	- For the definition of Solvent Process, it is unclear how the definition is adequate. A flue can be a stack or other pipe, they are discharge points.
Round 1 NCR/CL/OFI	CL: Please clarify in line with the finding.
Round 1 Response from Development Team	The definition has been revised.
Aster Global Findings - Round 2	- Text has been updated. Finding is closed

Item	36
Methodology Development and Review Process 04 October 2023, v4.3 (Section)	6.1.3
Methodology Development and Review Process 04 October 2023, v4.3 (Description)	4) Definitions: Assessment of whether the key terms in the methodology are defined clearly and appropriately and are used consistently in the methodology;
Evidence Used to Assess (Location in Meth/Module or Supporting Documents)	CCS+ Methodology Framework: Definitions
Aster Global Findings - Round 1	- For the definition of Sorbent Process, it is unclear why it is defined on as Adsorption.
Round 1 NCR/CL/OFI	CL: Please clarify in line with the finding.
Round 1 Response from Development Team	The sorbent processes may involve mechanisms like adsorption, absorption, ion exchange, chemisorption, precipitation, or complexation, depending on the nature of the substances being targeted and the properties of the sorbent material. The definition has been revised accordingly.
Aster Global Findings - Round 2	- Text has been updated. Finding is closed

Item	37
Methodology Development and Review Process 04 October 2023, v4.3 (Section)	6.1.3
Methodology Development and Review Process 04 October 2023, v4.3 (Description)	4) Definitions: Assessment of whether the key terms in the methodology are defined clearly and appropriately and are used consistently in the methodology;

Evidence Used to Assess (Location in Meth/Module or Supporting Documents)	CCS+ Methodology Framework: Definitions
Aster Global Findings - Round 1	The definition of Source Facility is very general, please clarify by being more specific.
Round 1 NCR/CL/OFI	CL: Please clarify in line with the finding.
Round 1 Response from Development Team	It has been revised.
Aster Global Findings - Round 2	Text has been updated. Finding is closed

Item	38
Methodology Development and Review Process 04 October 2023, v4.3 (Section)	6.1.3
Methodology Development and Review Process 04 October 2023, v4.3 (Description)	4) Definitions: Assessment of whether the key terms in the methodology are defined clearly and appropriately and are used consistently in the methodology;
Evidence Used to Assess (Location in Meth/Module or Supporting Documents)	CCS+ Methodology Framework: Definitions
Aster Global Findings - Round 1	For the definition of Storage Facility, it is unclear if a storage facility is only a geologic formation.
Round 1 NCR/CL/OFI	CL: Please clarify in line with the finding.
Round 1 Response from Development Team	It refers to the surface facilities, wells, subsurface, and geologic formations that allow pore spaces in a geologic reservoir to be assessed and used for permanent CO2 storage in a GCS project. It includes the injection site, geological reservoir, and related infrastructure necessary for the operation and monitoring of injection and storage activities. The definition has been revised accordingly.
Aster Global Findings - Round 2	Text has been updated. Finding is closed

Item	39
Methodology Development and Review Process 04 October 2023, v4.3 (Section)	6.1.3
Methodology Development and Review Process 04 October 2023, v4.3 (Description)	4) Definitions: Assessment of whether the key terms in the methodology are defined clearly and appropriately and are used consistently in the methodology;

Evidence Used to Assess (Location in Meth/Module or Supporting Documents)	CCS+ Methodology Framework: Definitions
Aster Global Findings - Round 1	- For the definition of Super Critical, it is unclear why the critical temperature does not include a reference pressure.
Round 1 NCR/CL/OFI	CL: Please clarify in line with the finding.
Round 1 Response from Development Team	It has been revised accordingly.
Aster Global Findings - Round 2	- Text has been updated. Finding is closed

Item	40
Methodology Development and Review Process 04 October 2023, v4.3 (Section)	6.1.3
Methodology Development and Review Process 04 October 2023, v4.3 (Description)	5) Applicability conditions: Assessment of whether the proposed methodology's applicability conditions are appropriate, adequate, and in conformance with VCS Program rules and requirements;
Evidence Used to Assess (Location in Meth/Module or Supporting Documents)	CCS+ Methodology Framework: Applicability conditions.
Aster Global Findings - Round 1	- It is unclear to the assessment team if the methodology is applicable globally.
Round 1 NCR/CL/OFI	CL: Please clarify in line with the finding.
Round 1 Response from Development Team	The methodology is applicable globally, and this information is already available in Section 4.
Aster Global Findings - Round 2	- Finding is closed.

Item	41
Methodology Development and Review Process 04 October 2023, v4.3 (Section)	6.1.3
Methodology Development and Review Process 04 October 2023, v4.3 (Description)	4) Definitions: Assessment of whether the key terms in the methodology are defined clearly and appropriately and are used consistently in the methodology;
Evidence Used to Assess (Location in Meth/Module or Supporting Documents)	CCS+ Methodology Framework: Definitions

Aster Global Findings Round 1	- It is unclear to the assessment team why combined heat and power is not defined in the definitions section.
Round 1 NCR/CL/OFI	CL: Please clarify in line with the finding.
Round 1 Response from Development Team	The definition of combined heat and power plant[10] has been included.
Aster Global Findings Round 2	- Text has been updated. Finding is closed

Item	42
Methodology Development and Review Process 04 October 2023, v4.3 (Section)	6.1.3
Methodology Development and Review Process 04 October 2023, v4.3 (Description)	4) Definitions: Assessment of whether the key terms in the methodology are defined clearly and appropriately and are used consistently in the methodology;
Evidence Used to Assess (Location in Meth/Module or Supporting Documents)	CCS+ Methodology Framework: Definitions
Aster Global Findings Round 1	- It is unclear to the assessment team why Native CO2 is not defined in the definitions section.
Round 1 NCR/CL/OFI	CL: Please clarify in line with the finding.
Round 1 Response from Development Team	The definition of native carbon dioxide (CO2) emissions has been included.
Aster Global Findings Round 2	- Text has been updated. Finding is closed

Item	43
Methodology Development and Review Process 04 October 2023, v4.3 (Section)	6.1.3
Methodology Development and Review Process 04 October 2023, v4.3 (Description)	3) Structure and clarity of methodology: Assessment of whether the methodology is written in a clear, logical, concise, and precise manner that will enable project developers to consistently implement projects and transparently report project results;
Evidence Used to Assess (Location in Meth/Module or Supporting Documents)	CCS+ Methodology Framework:
Aster Global Findings Round 1	- It is unclear to the assessment team what direct, and indirect capture refer to on P. 9, "The capture of CO2 from biomass combustion (direct or indirect)"

Round 1 NCR/CL/OFI	CL: Please clarify in line with the finding.
Round 1 Response from Development Team	Phrase is deleted. Only capture from the flue gas is included in the VMD00XX: Module for CO2 Capture from Biogenic Sources of Power and Heat and VMD00XX: Module for CO2 Capture from Bioproduction Processes modules.
Aster Global Findings Round 2	- Text has been updated. Finding is closed

Item	44
Methodology Development and Review Process 04 October 2023, v4.3 (Section)	6.1.3
Methodology Development and Review Process 04 October 2023, v4.3 (Description)	5) Applicability conditions: Assessment of whether the proposed methodology's applicability conditions are appropriate, adequate, and in conformance with VCS Program rules and requirements;
Evidence Used to Assess (Location in Meth/Module or Supporting Documents)	CCS+ Methodology Framework: Applicability conditions.
Aster Global Findings Round 1	- It is unclear to the assessment team what the wording in applicability condition #5 is requiring, specifically, the phrase "whichever is stringent."
Round 1 NCR/CL/OFI	CL: Please clarify in line with the finding.
Round 1 Response from Development Team	Please refer to response no 8. "In item 6, "stringent" term has been removed and criteria has been revised. In item 8, "stringent" refers to the refers to regulations that are more conservative. Applicability conditions are revised for further clarity. "
Aster Global Findings Round 2	- Text has been updated. Finding is closed

Item	45
Methodology Development and Review Process 04 October 2023, v4.3 (Section)	6.1.3
Methodology Development and Review Process 04 October 2023, v4.3 (Description)	5) Applicability conditions: Assessment of whether the proposed methodology's applicability conditions are appropriate, adequate, and in conformance with VCS Program rules and requirements;
Evidence Used to Assess (Location in Meth/Module or Supporting Documents)	CCS+ Methodology Framework: Applicability conditions.

Aster Global Findings Round 1	- It is unclear to the assessment team how second bullet for condition 5 and condition 6, which refer to processes for capture, transport etc., and purity of the CO2 relate to potential operating and environmental permits included in the applicability conditions.
Round 1 NCR/CL/OFI	CL: Please clarify in line with the finding.
Round 1 Response from Development Team	Geologic Carbon Storage (GCS) Requirements published by Verra sets out the rules and requirements applicable to all GCS projects under the VCS Program. The CCS-specific requirements regarding the regulatory oversight are set out in Section 3 of GCS Requirements.[11] Project proponents applying the CCS methodology must also fulfil the requirements outlined in the GCS document as specified in the methodology.
Aster Global Findings Round 2	- Description of the monitoring plan section has been updated and clearly details how the mentioned tools must be used within the methodology framework. Finding is closed. - After the findings were closed, Verra modified the methodology. These changes were driven by Verra requirements, moving guidance to the modules, updating to the current Verra style guide and to align the methodology to the ICVCM.

Item	46
Methodology Development and Review Process 04 October 2023, v4.3 (Section)	6.1.3
Methodology Development and Review Process 04 October 2023, v4.3 (Description)	12) Estimated GHG emission reductions and removals: Assessment of whether the approach for calculating the GHG emission reductions and carbon dioxide removals of the project is appropriate, adequate, conservative and in conformance with VCS Program rules and requirements;
Evidence Used to Assess (Location in Meth/Module or Supporting Documents)	CCS+ Methodology Framework:
Aster Global Findings Round 1	- It is unclear to the assessment team where the differences between reductions and removals are discussed in the methodology. The last paragraph in applicability discusses removals, but the paragraph may have been removed.
Round 1 NCR/CL/OFI	CL: Please clarify in line with the finding.
Round 1 Response from Development Team	The CCS methodology has a separate tool-VMD00XX: Differentiation between emission reductions and removals in Carbon Capture and Storage Projects- that establishes the principles and provides procedures for differentiating baseline emissions and allocating project emissions between activities that result in GHG emission reductions and removals for projects. As stated in Section 4 point 3, removals are defined. Also, the definitions of the carbon dioxide removal and GHG emission reduction are available in the VCS Program Definition, v4.4)[12]

Aster Global Findings Round 2	- Section 8.4, calculating GHG emission reductions and removals has been updated and clearly details when the mentioned tool must be used. Finding is closed
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Item	47
Methodology Development and Review Process 04 October 2023, v4.3 (Section)	6.1.3
Methodology Development and Review Process 04 October 2023, v4.3 (Description)	6) Project boundary: Assessment of whether an appropriate and adequate approach is provided for the definition of the project's physical boundary and sources and types of GHGs included;
Evidence Used to Assess (Location in Meth/Module or Supporting Documents)	CCS+ Methodology Framework: Project Boundary
Aster Global Findings Round 1	- It is unclear to the assessment team if it is possible that there would be land or operations that are not part of the project within the spatial area discussed in the first two paragraphs of section 5.
Round 1 NCR/CL/OFI	CL: Please clarify in line with the finding.
Round 1 Response from Development Team	<p>The project boundary is designed to include all physical and operational elements essential for the capture, transport, and storage of CO2 as outlined in the methodology. This encompasses sites, leases, rights-of-way, and other areas necessary for the operation and monitoring of the project, ensuring a comprehensive coverage of all activities directly related to the project's objectives.</p> <p>It's important to note that while the project boundary is intended to be all-encompassing for project-related activities, it may indeed exclude certain lands or operations that are not directly involved in the project's CO2 capture, transport, or storage processes. For example, areas within the spatial extent that are not utilized for project activities or do not contribute to the project's operations might not be considered part of the project boundary. In light of your comment, it seems there may be a need to make this distinction clearer in the text to avoid any confusion. Text has been updated accordingly.</p>
Aster Global Findings Round 2	- Text has been updated. Finding is closed - After the findings were closed, Verra modified the methodology. These changes were driven by Verra requirements, moving guidance to the modules, updating to the current Verra style guide and to align the methodology to the ICVCM.

Item	48
Methodology Development and Review Process 04 October 2023, v4.3 (Section)	6.1.3

Methodology Development and Review Process 04 October 2023, v4.3 (Description)	6) Project boundary: Assessment of whether an appropriate and adequate approach is provided for the definition of the project's physical boundary and sources and types of GHGs included;
Evidence Used to Assess (Location in Meth/Module or Supporting Documents)	CCS+ Methodology Framework: Project Boundary
Aster Global Findings - Round 1	It is unclear to the assessment team how it is ensured that the module boundaries don't overlap.
Round 1 NCR/CL/OFI	CL: Please clarify in line with the finding.
Round 1 Response from Development Team	In the CCS Methodology, the module boundaries have been clearly defined-please see Figure 1 (Project Activity Boundary) and the methodology comprises a comprehensive framework that encompasses all stages of the process, from CO2 sources to capture facilities, transportation, and storage activities. Additionally, each module includes its own boundary on the activity type. Please see the following figures: 1-The Direct Air Capture Module-Figure 1 and 2 2-The Storage Module: Figure 1 and 2 3- The Module of CO2 Transport: Figure 1 and 2 Additionally, project proponents must provide supporting documentation demonstrating the project boundary during the validation and verification steps.
Aster Global Findings - Round 2	Text has been updated to detail how equipment shared between modules must be allocated to ensure nothing is missed or double counted.

Item	49
Methodology Development and Review Process 04 October 2023, v4.3 (Section)	6.1.3
Methodology Development and Review Process 04 October 2023, v4.3 (Description)	3) Structure and clarity of methodology: Assessment of whether the methodology is written in a clear, logical, concise, and precise manner that will enable project developers to consistently implement projects and transparently report project results;
Evidence Used to Assess (Location in Meth/Module or Supporting Documents)	CCS+ Methodology Framework: Baseline
Aster Global Findings - Round 1	It is unclear to the assessment team if greenfield should be stated as new construction or new facility.
Round 1 NCR/CL/OFI	CL: Please clarify in line with the finding.
Round 1 Response from Development Team	The greenfield capture facility refers to a new carbon capture plant that is constructed and operated at a site where no carbon capture activity was operated prior to the implementation of the project activity. The definition has been included in Section 3.

Aster Global Findings Round 2	- Text has been updated. Finding is closed
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Item	50
Methodology Development and Review Process 04 October 2023, v4.3 (Section)	6.1.3
Methodology Development and Review Process 04 October 2023, v4.3 (Description)	7) Baseline scenario: Assessment of whether the approach for determining the baseline scenario is appropriate, adequate, and in conformance with VCS Program rules and requirements;
Evidence Used to Assess (Location in Meth/Module or Supporting Documents)	CCS+ Methodology Framework:
Aster Global Findings Round 1	It is unclear to the assessment team what happens if the tool referenced on page 22 "If applicable, determined as per the latest version of VMT00XX:Tool for Non-VCS-CO2 in Carbon Capture and Storage Projects" is not available at publication of the methodology. How is applicability defined?
Round 1 NCR/CL/OFI	CL: Please clarify in line with the finding.
Round 1 Response from Development Team	The non-VCS tool establishes the criteria and procedures for quantifying and allocating project and leakage emissions for projects where non-VCS CO2 flows enter the project boundary. The tool is applicable to all projects where non-VCS CO2 flows enter the project boundary. As the tool is currently under review, project proponents must await Verra's final approval and publication of it, prior to assessing the non-VCS flows and submitting a project for registration.
Aster Global Findings Round 2	- Finding is closed.

Item	51
Methodology Development and Review Process 04 October 2023, v4.3 (Section)	6.1.3
Methodology Development and Review Process 04 October 2023, v4.3 (Description)	13) Monitoring: Assessment of whether the monitoring approach is appropriate, adequate, and in conformance with VCS Program rules and requirements;
Evidence Used to Assess (Location in Meth/Module or Supporting Documents)	CCS+ Methodology Framework:

Aster Global Findings - Round 1	It is unclear to the assessment team, how, other flow measurement options will be accommodated by the methodology over its lifetime, if measurements "must be performed using either volumetric flow meters or mass flow meters"
Round 1 NCR/CL/OFI	CL: Please clarify in line with the finding.
Round 1 Response from Development Team	As per the requirements of Verra, the standardized measurement methods will be re-evaluated periodically over the lifetime of the technology to ensure that they are still valid. If new methods are developed, the project proponents will carry out a revision of the methodology in line with Verra's procedures.
Aster Global Findings - Round 2	Finding is closed.

Item	52
VCS Methodology Requirements v4.4 4 October 2023 (Section)	2.1.3
VCS Methodology Requirements v4.4 4 October 2023 (Description)	Methodologies shall be guided by the principles set out in the VCS Standard. They shall clearly state the assumptions, parameters and procedures that have significant uncertainty, and describe how such uncertainty shall be addressed.
Evidence Used to Assess (Location in Meth/Module or Supporting Documents)	CCS Meth Framework
Aster Global Findings - Round 1	It is unclear to the assessment team if any of the parameters/procedures/assumptions have significant uncertainty. The assessment team notes that the uncertainty assessment excel file shows a number of parameters with significant uncertainty, but it is unclear how these values were determined.
Round 1 NCR/CL/OFI	CL: Please clarify in line with the finding.
Round 1 Response from Development Team	Uncertainty assessment with updated references are provided to the VVB. In addition to that section 8.5 is added to the methodology guide project developers on uncertainty assessment.
Aster Global Findings - Round 2	The assessment reviewed the Uncertainty assessment guidelines added to the methodology. Finding is closed.

Item	53
VCS Methodology Requirements v4.4 4 October 2023 (Section)	2.2.1
VCS Methodology Requirements v4.4 4 October 2023 (Description)	Methodologies may employ a modular approach in which a framework document provides the structure of the methodology and separate modules and/or tools are used to perform specific methodological tasks. Such methodologies shall use the VCS Methodology Template for the framework document and the VCS Module Template for the modules and tools. The framework document shall clearly state how the modules and/or tools are to be used within the context of the methodology

Evidence Used to Assess (Location in Meth/Module or Supporting Documents)	Section 9.3 - Description of the Monitoring Plan, Section 1 - Sources
Aster Global Findings Round 1	It is unclear to the assessment team how the Geologic Carbon Storage (GCS) Requirements and the GCS Non-Permanence Risk Tool are to be used within the context of the methodology. The assessment team notes the tools and requirements are mentioned in Section 9.3, but the document names do not match the source names in section 1. The assessment team also notes that the requirement in section 9.3 says "monitoring provisions" are there other requirements in these documents outside of monitoring that a project activity must follow?
Round 1 NCR/CL/OFI	CL: Please clarify in line with the finding
Round 1 Response from Development Team	Methodology is revised to ensure all references are consistent through out the documents. Section 9.3 of the methodology is revised to provide clarity on the use of GCS and NPRT.
Aster Global Findings Round 2	The assessment team reviewed the updated 9.3 section of the methodology framework. The references to the GCS requirements are updated and written much more clearly. Finding is closed. After the findings were closed, Verra modified the methodology. These changes were driven by Verra requirements, moving guidance to the modules, updating to the current Verra style guide and to align the methodology to the ICVCM.

Item	54
VCS Methodology Requirements v4.4 4 October 2023 (Section)	2.2.4
VCS Methodology Requirements v4.4 4 October 2023 (Description)	A standardized method shall be used as the preferred option for determining additionality. Where a methodology does not employ a standardized method for additionality, the proponent shall provide a justification for why such an approach is not appropriate or possible.
Evidence Used to Assess (Location in Meth/Module or Supporting Documents)	Section 7 - CCS+ Meth
Aster Global Findings Round 1	Section 7 states that a project method will be used to determine additionality. As the project does not use a standardized approach (i.e. performance or activity), it is unclear why a justification is not provided in line with this requirement.
Round 1 NCR/CL/OFI	CL: Please clarify in line with the finding
Round 1 Response from Development Team	The justification for choosing the project method is provided in the Annex of the CCS methodology.
Aster Global Findings Round 2	The assessment team reviewed Appendix 1: Background Information which clearly details why a project method over a standard method. Finding is closed.

Item	55
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VCS Methodology Requirements v4.4 4 October 2023 (Section)	2.4.2
VCS Methodology Requirements v4.4 4 October 2023 (Description)	Methodology developers shall include within the methodology an assessment of uncertainties that may result from application of the methodology. Methodology developers shall make reasonable assumptions (based on available data, literature and precision standards included in the methodology) of the uncertainty ranges of the parameters in the methodology. They shall estimate the resulting uncertainty of reductions and removals, using standard error propagation equations or simulation techniques. The assessment shall conclude whether there is a significant risk that the uncertainty for estimating reductions and removals (i.e., the halfwidth of the two-sided 90 percent confidence interval) could exceed 10 percent of the estimated value. The risk shall be deemed significant where uncertainties are expected to exceed 10 percent in at least 10 percent of the cases (i.e., the worst case scenario). See box below for an example uncertainty calculation.
Evidence Used to Assess (Location in Meth/Module or Supporting Documents)	CCS Meth Framework
Aster Global Findings - Round 1	It is unclear to the assessment team where the assessment of uncertainties, and the accompanying estimate of uncertainty of reductions and removal is located within the methodology. The assessment team notes it received an uncertainty analysis from the project development team. See finding 1.
Round 1 NCR/CL/OFI	NCR: Please clarify in line with the finding and the requirement.
Round 1 Response from Development Team	8.5 is added to the methodology guide project developers on uncertainty assessment.
Aster Global Findings - Round 2	The assessment team reviewed the Uncertainty assessment guidelines added to the methodology. Finding is closed.

Item	56
VCS Methodology Requirements v4.4 4 October 2023 (Section)	2.6.2
VCS Methodology Requirements v4.4 4 October 2023 (Description)	Methodologies shall include an analysis of the risk of carbon lock-in in an appendix. The analysis shall consider alternative technologies or practices with lower GHG emissions and consider typical project lifetimes against the risk of entrenching consumer behavior, business practices, or physical infrastructure that increases or prolongs unabated fossil fuel consumption.
Evidence Used to Assess (Location in Meth/Module or Supporting Documents)	No appendix
Aster Global Findings - Round 1	The methodology does not include a risk analysis of carbon lock-in in an appendix per the requirement. (2024-03-26)
Round 1 NCR/CL/OFI	NCR: Please clarify in line with finding.

Round 1 Response from Development Team	When we submitted our documents to VERRA on June 30, 2023, we adhered to the rules outlined in Version 4.3 of the VERRA Methodology Requirements. The mandate to include assessment for carbon lock-in was introduced in Version 4.4 of the methodology requirements, which applies only to methodologies that had not commenced public consultation by that date. Given this timeline, our submission pre-dates these changes, and as such, we respectfully request that our submission be evaluated based on the requirements that were in force at the time of our submission.
Aster Global Findings - Round 2	The assessment team reviewed the latest version of Verras "Program Effective Dates Document" and confirmed with Verra that this requirement will not apply to this methodology. Finding is closed.

Item	57
VCS Methodology Requirements v4.4 4 October 2023 (Section)	2.6.3
VCS Methodology Requirements v4.4 4 October 2023 (Description)	Methodologies shall exclude project activities in jurisdictions with net zero objectives if the project activity is not compatible with such objectives.
Evidence Used to Assess (Location in Meth/Module or Supporting Documents)	CCS Methodology Framework
Aster Global Findings - Round 1	It is unclear to the assessment team how projects in jurisdictions with net zero objectives would be excluded from using this methodology if the project activity is not compatible with such objectives.
Round 1 NCR/CL/OFI	CL: Please clarify in line with finding.
Round 1 Response from Development Team	When we submitted our documents to VERRA on June 30, 2023, we adhered to the rules outlined in Version 4.3 of the VERRA Methodology Requirements. The mandate to include assessment for carbon lock-in was introduced in Version 4.4 of the methodology requirements, which applies only to methodologies that had not commenced public consultation by that date. Given this timeline, our submission pre-dates these changes, and as such, we respectfully request that our submission be evaluated based on the requirements that were in force at the time of our submission.
Aster Global Findings - Round 2	The assessment team reviewed the latest version of Verras "Program Effective Dates Document" and confirmed with Verra that this requirement will not apply to this methodology. Finding is closed.

Item	58
VCS Methodology Requirements v4.4 4 October 2023 (Section)	3.2.2

VCS Methodology Requirements v4.4 4 October 2023 (Description)	Applicability conditions shall be specified clearly, and in a manner that allows easy determination of whether an activity being undertaken by a potential project proponent is eligible.
Evidence Used to Assess (Location in Meth/Module or Supporting Documents)	Section 4 - Applicability conditions #'s 2 & 3
Aster Global Findings - Round 1	It is unclear to the assessment team why the DAC module is listed two times (one time in bullet #2 and once ins bullet #3) within the list of applicability conditions.
Round 1 NCR/CL/OFI	CL: Please clarify in line with the finding.
Round 1 Response from Development Team	We acknowledge the confusion caused by the repetition and the split of information across bullet points #2 and #3. To address this, we have revised the applicability section. All eligible capture activities, including the DAC module, are now consolidated and clearly listed under bullet point #2. This change ensures that the applicability conditions are specified in a clear and straightforward manner, facilitating an easy determination of eligibility for potential project proponents
Aster Global Findings - Round 2	The assessment team reviewed the updated applicability conditions and agrees that the changes provide more clarity to the conditions. Finding is closed.

Item	59
VCS Methodology Requirements v4.4 4 October 2023 (Section)	3.2.2
VCS Methodology Requirements v4.4 4 October 2023 (Description)	Applicability conditions shall be specified clearly, and in a manner that allows easy determination of whether an activity being undertaken by a potential project proponent is eligible.
Evidence Used to Assess (Location in Meth/Module or Supporting Documents)	Section 4 - Applicability conditions #'s 2 & 3
Aster Global Findings - Round 1	It is unclear to the assessment team why the eligible capture activity modules are split into different bullets within the applicability section (#2 & #3). (2024-03-14)
Round 1 NCR/CL/OFI	CL: Please clarify the rationale for listing capture activities in separate bullets.
Round 1 Response from Development Team	We acknowledge the confusion caused by the repetition and the split of information across bullet points #2 and #3. To address this, we have revised the applicability section. All eligible capture activities, including the DAC module, are now consolidated and clearly listed under bullet point #2. This change ensures that the applicability conditions are specified in a clear and straightforward manner, facilitating an easy determination of eligibility for potential project proponents

Aster Global Findings Round 2	- The assessment team reviewed the updated applicability conditions and agrees that the changes provide more clarity to the conditions. Finding is closed.
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Item	60
VCS Methodology Requirements v4.4 4 October 2023 (Section)	3.2.3
VCS Methodology Requirements v4.4 4 October 2023 (Description)	Applicability conditions shall not contain procedures or obligations upon the project proponent. Rather, they shall be conditions against which project eligibility can be determined at the time of validation and shall not require the project proponent to undertake ongoing actions to ensure continued eligibility.
Evidence Used to Assess (Location in Meth/Module or Supporting Documents)	Section 4 - Applicability condition #6, Bullet 1
Aster Global Findings Round 1	- It is unclear to the assessment team how a minimum concentration purity requirement could be validated and not require ongoing monitoring. (2024-03-26)
Round 1 NCR/CL/OFI	CL: Please clarify in line with the finding and requirement.
Round 1 Response from Development Team	Applicability condition is revised to refer to the design of the capture facility instead of operational requirements. Revised text is below and also added to the updated document. The capture facility must be designed to handle a CO2 stream delivered to the storage site that meets the following requirements: A minimum concentration of 95% purity and complies with the applicable regulations of the national/regional/local project jurisdiction related to CO2 purity and the concentration of co-injected substances.
Aster Global Findings Round 2	- The assessment team reviewed the updated language. Finding is closed.

Item	61
VCS Methodology Requirements v4.4 4 October 2023 (Section)	3.3.2
VCS Methodology Requirements v4.4 4 October 2023 (Description)	In identifying GHG sources, sinks and reservoirs relevant to the project, methodologies shall set out criteria and procedures for identifying and assessing GHG sources, sinks and reservoirs that are controlled by the project proponent, related to the project or affected by the project (i.e., leakage).
Evidence Used to Assess (Location in Meth/Module or Supporting Documents)	Section 5 - Project Boundary, description of GHG sources

Aster Global Findings - Round 1	It is unclear to the assessment team how the usage of "primary" and "secondary" effects adds clarity to the document. It appears that primary effects are defined as project emissions and secondary effects is defined as leakage. However the assessment team notes the definition of secondary does not match the leakage definition exactly. (2024-03-14)
Round 1 NCR/CL/OFI	CL: Please clarify how the terms "primary" and "secondary" differ from the VCS defined terms "project" and "leakage" and clarify why their usage is beneficial to the clarity of the methodology.
Round 1 Response from Development Team	We have revised our document to ensure that the terms "project emissions" and "leakage" are used explicitly to avoid any misinterpretation. This amendment aligns with the VCS requirements for identifying and assessing GHG sources, sinks, and reservoirs that are controlled by the project proponent, related to the project, or affected by the project (i.e., leakage).
Aster Global Findings - Round 2	The usage of secondary and primary have been removed or have been used in a clear straightforward way. Finding is closed.

Item	62
VCS Methodology Requirements v4.4 4 October 2023 (Section)	3.3.2
VCS Methodology Requirements v4.4 4 October 2023 (Description)	In identifying GHG sources, sinks and reservoirs relevant to the project, methodologies shall set out criteria and procedures for identifying and assessing GHG sources, sinks and reservoirs that are controlled by the project proponent, related to the project or affected by the project (i.e., leakage).
Evidence Used to Assess (Location in Meth/Module or Supporting Documents)	Section 5 - Project Boundary, description of GHG sources
Aster Global Findings - Round 1	It is unclear to the assessment team how "CO2 capture, transport and storage" listed as the first bullet on page 12 is a GHG source, sink, or reservoir.
Round 1 NCR/CL/OFI	CL: Please clarify how the first bullet point under "primary effects GHG sources sinks, and reservoirs" is relevant/adds clarity to the project boundary.
Round 1 Response from Development Team	The purpose of including these elements as part of the primary effects within the project boundary is to ensure comprehensive accounting and monitoring of all potential GHG impacts associated with each stage of the project. Text is revised to provide more clarity.
Aster Global Findings - Round 2	Text has been updated. Finding is closed.

Item	63
VCS Methodology Requirements v4.4 4 October 2023 (Section)	3.3.2

VCS Methodology Requirements v4.4 4 October 2023 (Description)	In identifying GHG sources, sinks and reservoirs relevant to the project, methodologies shall set out criteria and procedures for identifying and assessing GHG sources, sinks and reservoirs that are controlled by the project proponent, related to the project or affected by the project (i.e., leakage).
Evidence Used to Assess (Location in Meth/Module or Supporting Documents)	Section 5 - Project Boundary, description of GHG sources
Aster Global Findings - Round 1	It is unclear to the assessment team how CH4/N2O project emissions (Fugitive and venting) in Table 1 are said to be included in column 3 by the "Yes" statement, but column 4 says "excluded as also not considered under the baseline scenario."
Round 1 NCR/CL/OFI	CL: Please clarify in line with the finding
Round 1 Response from Development Team	Table 1 is revised. CH4 and N2O emissions are excluded for fugitive and venting emissions.
Aster Global Findings - Round 2	Table has been updated. Finding is closed. After the findings were closed, Verra modified the methodology. These changes were driven by Verra requirements, moving guidance to the modules, updating to the current Verra style guide and to align the methodology to the ICVCM.

Item	64
VCS Methodology Requirements v4.4 4 October 2023 (Section)	3.3.2
VCS Methodology Requirements v4.4 4 October 2023 (Description)	In identifying GHG sources, sinks and reservoirs relevant to the project, methodologies shall set out criteria and procedures for identifying and assessing GHG sources, sinks and reservoirs that are controlled by the project proponent, related to the project or affected by the project (i.e., leakage).
Evidence Used to Assess (Location in Meth/Module or Supporting Documents)	Section 5 - Project Boundary, description of GHG sources
Aster Global Findings - Round 1	It is unclear why the Justification/Explanation in Table 1 of the methodology framework is different than the Justification/Explanation in the DAC module. Consistent descriptions can help prevent confusion during project development.
Round 1 NCR/CL/OFI	CL: Please clarify in line with the finding.
Round 1 Response from Development Team	Table 1 of the DAC module is revised.
Aster Global Findings - Round 2	Table has been updated. Finding is closed.

Item	65
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VCS Methodology Requirements v4.4 4 October 2023 (Section)	3.3.2
VCS Methodology Requirements v4.4 4 October 2023 (Description)	In identifying GHG sources, sinks and reservoirs relevant to the project, methodologies shall set out criteria and procedures for identifying and assessing GHG sources, sinks and reservoirs that are controlled by the project proponent, related to the project or affected by the project (i.e., leakage).
Evidence Used to Assess (Location in Meth/Module or Supporting Documents)	Section 5 - Project Boundary, description of GHG sources
Aster Global Findings - Round 1	It is unclear to the assessment team what "PDD" acronym means in the "transition areas" paragraph, as it is not defined or used anywhere else in the methodology.
Round 1 NCR/CL/OFI	CL: Please clarify in line with the finding.
Round 1 Response from Development Team	The statement is revised to: This decision must be documented and justified during the validation.
Aster Global Findings - Round 2	Undefined acronym has been removed and text updated. Finding is closed.

Item	66
VCS Methodology Requirements v4.4 4 October 2023 (Section)	3.3.2
VCS Methodology Requirements v4.4 4 October 2023 (Description)	In identifying GHG sources, sinks and reservoirs relevant to the project, methodologies shall set out criteria and procedures for identifying and assessing GHG sources, sinks and reservoirs that are controlled by the project proponent, related to the project or affected by the project (i.e., leakage).
Evidence Used to Assess (Location in Meth/Module or Supporting Documents)	Section 5 - Project Boundary, description of GHG sources
Aster Global Findings - Round 1	It is unclear to the assessment team why Table 1's SSRs do not align with Figure 1. Please clarify the differences between the sources.
Round 1 NCR/CL/OFI	CL: Please clarify in line with the finding.
Round 1 Response from Development Team	Figure 1 primarily illustrates the boundary of the project activity. To clarify the relationship with Table 1, which details the Specific Source Requirements (SSRs), please refer to the additional figures included in the modules. These figures are designed to align the SSRs with the project activities and boundary configurations depicted in Table 1, ensuring a comprehensive understanding of the scope and management of GHG sources within the project boundary.

Aster Global Findings - Round 2	The assessment team agrees with the development team that the modules are appropriate locations to provide more detailed figures which will more detail the appropriate SSRs. Finding is closed.
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Item	67
VCS Methodology Requirements v4.4 4 October 2023 (Section)	3)
VCS Methodology Requirements v4.4 4 October 2023 (Description)	Compare the GHG sources, sinks and reservoirs identified for the project with those identified in the baseline scenario, to ensure equivalency and consistency.
Evidence Used to Assess (Location in Meth/Module or Supporting Documents)	Section 5 - Table 1
Aster Global Findings - Round 1	It is unclear to the assessment team how the GHG sources, sinks, and reservoirs identified for the project are equivalent and consistent to the baseline scenario GHG sources, sinks and reservoirs.
Round 1 NCR/CL/OFI	CL: Please clarify in line with the finding
Round 1 Response from Development Team	Table 1 is revised to be inline with the baseline scenario.
Aster Global Findings - Round 2	The assessment team reviewed the updated table and notes that the SSR's are as inline with the baseline as possible given the baseline scenario determination. The assessment notes that each capture module will have further guidance and requirements for capture specific baseline scenarios. Finding is closed. After the findings were closed, Verra modified the methodology. These changes were driven by Verra requirements, moving guidance to the modules, updating to the current Verra style guide and to align the methodology to the ICVCM. Baseline section moved to the capture modules.

Item	68
VCS Methodology Requirements v4.4 4 October 2023 (Section)	3.4
VCS Methodology Requirements v4.4 4 October 2023 (Description)	The baseline scenario represents the activities and GHG emissions that would occur in the absence of the project activity. The baseline scenario must be accurately determined so that an accurate comparison can be made between the GHG emissions and/or carbon stock changes that would have occurred under the baseline scenario and reductions and/or carbon stock changes achieved by project activities.
Evidence Used to Assess (Location in Meth/Module or Supporting Documents)	Section 6 - Baseline Scenario

Aster Global Findings Round 1	It is unclear to the assessment team which baseline scenario in the methodology would be applicable to the DAC module project activity that is capable of capture from point sources and the atmosphere. Please clarify which baseline scenario would apply to the above situation. (2024-03-14)
Round 1 NCR/CL/OFI	CL: Please clarify in line with the finding
Round 1 Response from Development Team	It allows co-capture of fossil fuel combustion CO2 in a DAC facility, but projects can produce only carbon dioxide removals. Section 6 is revised as follows: This methodology uses a project method to determine the crediting baseline scenario. The eligible baseline scenarios under this methodology include one or a combination of the following: <ul style="list-style-type: none"> • For CO2 captured from point sources: the CO2 captured under the project activity would be emitted to the atmosphere in the absence of the project activity. • For CO2 captured from the atmosphere: the CO2 captured under the project activity would not be captured in the absence of the project activity.
Aster Global Findings Round 2	The baseline scenario language has been updated to provide more clarity. Co-capture language has been added to the DAC module. Finding is closed. After the findings were closed, Verra modified the methodology. These changes were driven by Verra requirements, moving guidance to the modules, updating to the current Verra style guide and to align the methodology to the ICVCM. Baseline section moved to the capture modules.

Item	69
VCS Methodology Requirements v4.4 4 October 2023 (Section)	3.6
VCS Methodology Requirements v4.4 4 October 2023 (Description)	Baseline and project emissions, carbon stocks or stock changes must be accurately quantified to determine reductions and removals achieved by projects. Methodologies must therefore set out procedures to quantify the GHG emissions and carbon stocks associated with the project.
Evidence Used to Assess (Location in Meth/Module or Supporting Documents)	CCS Meth Framework - Equation 1, DAC Module, Transport Module, Storage Module
Aster Global Findings Round 1	It is unclear to the assessment team how equation (1) in the methodology assessment can actually be calculated. The two parameters (Q_CO2,injected and Q_CO2,nonVCS,injected) do not appear to be mentioned in any other equations or modules. (2024-03-16)
Round 1 NCR/CL/OFI	CL: Please clarify in line with the finding.
Round 1 Response from Development Team	Guidance for monitoring parameters are added in the definition for parameters. Which refers to subsequent section.
Aster Global Findings Round 2	Description of the baseline parameters have been updated. Finding is closed.

Item	70
VCS Methodology Requirements v4.4 4 October 2023 (Section)	3.7
VCS Methodology Requirements v4.4 4 October 2023 (Description)	Leakage is the net change of anthropogenic GHG emissions that occurs outside the project boundary and is attributable to project activities. Methodologies must establish procedures to quantify leakage, where the potential for leakage is identified, as projects may otherwise overestimate their net emission reductions and/or removals.
Evidence Used to Assess (Location in Meth/Module or Supporting Documents)	CCS Meth Framework - Appendix I
Aster Global Findings - Round 1	<p>It is unclear to the assessment team what purpose the Materiality threshold serves within the methodology. Does the 2% threshold apply to the leakage sources listed in the modules (i.e. upstream electricity)? Meaning if one of the leakage sources is under 2% then it is not required to be calculated? Or does the materiality threshold only apply to leakage sources listed in the methodology that are not detailed in the modules (i.e. Decommission and disposal activities for equipment and materials)?</p> <p>Pending the response to the above finding, please clarify the language to make it clear if leakage sources listed in the modules can be excluded if they are under the 2% threshold. (2024-03-26)</p>
Round 1 NCR/CL/OFI	CL: Please clarify in line with the finding.
Round 1 Response from Development Team	The 2% materiality threshold is applied to determine which leakage emissions should be included in the GHG quantification. A leakage source is included in the quantification if it is estimated to be over 2% of the net project emission reductions and Carbon Dioxide removals over the anticipated typical project lifetime. At the same time it was ensured that the total excluded leakage emissions do not exceed the 2% threshold. This threshold helps in identifying significant leakage sources while allowing for the exclusion of minor ones to simplify the calculation process. The document also lists specific leakage sources that are typically excluded, such as the production and transport of equipment and materials for construction, and staff commuting. To address your point about optional leakage sources, the methodology provides which emissions sources are considered material and should be included. This is determined based on the justification provided in the methodology for the materiality threshold, and it is not the responsibility of the project proponent to conduct materiality checks for each project activity.
Aster Global Findings - Round 2	The materiality threshold language has been updated, and moved to Appendix 1. Finding is closed.

Item	71
VCS Methodology Requirements v4.4 4 October 2023 (Section)	3.8.3

VCS Methodology Requirements v4.4 4 October 2023 (Description)	Methodologies that quantify both reductions and removals shall include separate equations for reductions and removals.
Evidence Used to Assess (Location in Meth/Module or Supporting Documents)	CCS Meth - Section 8 - Quantification of estimated GHG Emission reductions and removals
Aster Global Findings - Round 1	The introduction paragraph to section 8 states a project activity may result in GHG emission reductions and/or removals, but separate equations are not provided for project activities that quantify both reductions and removals.
Round 1 NCR/CL/OFI	CL: Please clarify in line with the finding.
Round 1 Response from Development Team	The CCS methodology has a separate tool-VMD00XX: Tool for Differentiating Reductions and Removals in CCS Projects- that establishes the principles and provides procedures for differentiating baseline emissions and allocating project emissions between activities that result in GHG emission reductions and removals for projects. As stated in Section 8.4, projects that achieve both reductions and removals are required to adhere to the latest version of Tool for Differentiating Reductions and Removals in CCS Projects Accordingly, Equation (9) is replaced by Equations (25) and (26) from this tool. To provide more clarity eq. 25 and 26 from the tool is added to the methodology.
Aster Global Findings - Round 2	The language and requirements for differentiating between reductions and removals has been updated, and provides clear instructions to project developers. The referenced tool provides more details and is an appropriate location the information. Finding is closed.

Item	72
VCS Methodology Requirements v4.4 4 October 2023 (Section)	1)
VCS Methodology Requirements v4.4 4 October 2023 (Description)	Project and leakage emissions related only to reductions shall be included in the reduction calculation.
Evidence Used to Assess (Location in Meth/Module or Supporting Documents)	CCS Meth - Section 8 - Quantification of estimated GHG Emission reductions and removals
Aster Global Findings - Round 1	It is unclear to the assessment team how project and leakage emissions are related to reduction vs removal.
Round 1 NCR/CL/OFI	CL: Please clarify in line with the finding.

<p>Round 1 Response from Development Team</p>	<p>The CCS methodology has a separate tool-VMD00XX: Tool for Differentiating Reductions and Removals in CCS Projects - that establishes the principles and provides procedures for allocating project and leakage emissions between activities that result in GHG emission reductions and removals for projects. Project developers must choose one or a combination of the following options to allocate corresponding project and leakage emissions according to Section 5.5 in the tool.</p> <p>Option 1 is a differentiation method that permissible for segments where captured CO2 can be categorized as reductions or removals based on equipment or temporal differentiation. In case Option 1 is chosen, Equations (17), (18), (19) and (20), must be used to assign the differentiated portion of project and leakage emissions to either removals or reductions.</p> <p>Option 2 is a mass balance method that permissible for segments where the flows of removals and reductions follow the same pathway within the project boundary (i.e., travel modes and distances are equal, and all facilities are shared).Option 2 is chosen, Project and leakage emissions associated with emission removals will be calculated according to the Equation (21) and (22) . Equations (23) and (24) allocate project and leakage emissions, respectively, from a segment based on the fraction of the CO2 stream that qualifies as emission reductions.</p>
<p>Aster Global Findings Round 2</p>	<p>The language and requirements for differentiating between reductions and removals has been updated, and provides clear instructions to project developers. The referenced tool provides more details and is an appropriate location the information. Finding is closed.</p>

Item	73
<p>VCS Methodology Requirements v4.4 4 October 2023 (Section)</p>	<p>2)</p>
<p>VCS Methodology Requirements v4.4 4 October 2023 (Description)</p>	<p>Project and leakage emissions related only to removals shall be included in the removal calculation.</p>
<p>Evidence Used to Assess (Location in Meth/Module or Supporting Documents)</p>	<p>CCS Meth - Section 8 - Quantification of estimated GHG Emission reductions and removals</p>
<p>Aster Global Findings Round 1</p>	<p>It is unclear to the assessment team how project and leakage emissions are related to reduction vs removal.</p>
<p>Round 1 NCR/CL/OFI</p>	<p>CL: Please clarify in line with the finding.</p>

<p>Round 1 Response from Development Team</p>	<p>Please see response #15.</p> <p>"The CCS methodology has a separate tool-VMD00XX: Tool for Differentiating Reductions and Removals in CCS Projects - that establishes the principles and provides procedures for allocating project and leakage emissions between activities that result in GHG emission reductions and removals for projects. Project developers must choose one or a combination of the following options to allocate corresponding project and leakage emissions according to Section 5.5 in the tool.</p> <p>Option 1 is a differentiation method that permissible for segments where captured CO2 can be categorized as reductions or removals based on equipment or temporal differentiation. In case Option 1 is chosen, Equations (17), (18), (19) and (20), must be used to assign the differentiated portion of project and leakage emissions to either removals or reductions.</p> <p>Option 2 is a mass balance method that permissible for segments where the flows of removals and reductions follow the same pathway within the project boundary (i.e., travel modes and distances are equal, and all facilities are shared).Option 2 is chosen, Project and leakage emissions associated with emission removals will be calculated according to the Equation (21) and (22) . Equations (23) and (24) allocate project and leakage emissions, respectively, from a segment based on the fraction of the CO2 stream that qualifies as emission reductions."</p>
<p>Aster Global Findings - Round 2</p>	<p>The language and requirements for differentiating between reductions and removals has been updated, and provides clear instructions to project developers. The referenced tool provides more details and is an appropriate location the information. Finding is closed.</p>

<p>Item</p>	<p>74</p>
<p>VCS Methodology Requirements v4.4 4 October 2023 (Section)</p>	<p>3)</p>
<p>VCS Methodology Requirements v4.4 4 October 2023 (Description)</p>	<p>Project and leakage emissions related to both reductions and removals shall be allocated proportionally to the amount of reductions and removals.</p>
<p>Evidence Used to Assess (Location in Meth/Module or Supporting Documents)</p>	<p>CCS Meth - Section 8 - Quantification of estimated GHG Emission reductions and removals</p>
<p>Aster Global Findings - Round 1</p>	<p>It is unclear to the assessment team how project and leakage emissions are related to reduction vs removal.</p>
<p>Round 1 NCR/CL/OFI</p>	<p>CL: Please clarify in line with the finding.</p>

<p>Round 1 Response from Development Team</p>	<p>Please see response #15.</p> <p>"The CCS methodology has a separate tool-VMD00XX: Tool for Differentiating Reductions and Removals in CCS Projects - that establishes the principles and provides procedures for allocating project and leakage emissions between activities that result in GHG emission reductions and removals for projects. Project developers must choose one or a combination of the following options to allocate corresponding project and leakage emissions according to Section 5.5 in the tool.</p> <p>Option 1 is a differentiation method that permissible for segments where captured CO2 can be categorized as reductions or removals based on equipment or temporal differentiation. In case Option 1 is chosen, Equations (17), (18), (19) and (20), must be used to assign the differentiated portion of project and leakage emissions to either removals or reductions.</p> <p>Option 2 is a mass balance method that permissible for segments where the flows of removals and reductions follow the same pathway within the project boundary (i.e., travel modes and distances are equal, and all facilities are shared).Option 2 is chosen, Project and leakage emissions associated with emission removals will be calculated according to the Equation (21) and (22) . Equations (23) and (24) allocate project and leakage emissions, respectively, from a segment based on the fraction of the CO2 stream that qualifies as emission reductions."</p> <p>Additionally, project and leakage emissions are related to reduction vs removal must be calculated according to the Equations (25) and (26) calculate the total project emission removals and reductions.</p>
<p>Aster Global Findings Round 2</p>	<p>The language and requirements for differentiating between reductions and removals has been updated, and provides clear instructions to project developers. The referenced tool provides more details and is an appropriate location the information. Finding is closed.</p>

<p>Item</p>	<p>75</p>
<p>VCS Methodology Requirements v4.4 4 October 2023 (Section)</p>	<p>4)</p>
<p>VCS Methodology Requirements v4.4 4 October 2023 (Description)</p>	<p>Non-permanence risk adjustments shall be allocated proportionally to the total reductions and removals.</p>
<p>Evidence Used to Assess (Location in Meth/Module or Supporting Documents)</p>	<p>CCS Meth - Section 8 - Quantification of estimated GHG Emission reductions and removals</p>
<p>Aster Global Findings Round 1</p>	<p>It is unclear to the assessment team how or if Non-permanence risk adjustments will affect the total reductions and removals.</p>
<p>Round 1 NCR/CL/OFI</p>	<p>CL: Please clarify in line with the finding.</p>

Round 1 Response from Development Team	The GCS Non-Permanence Risk Tool outlines procedures for assessing non-permanence risk and determining buffers required for Geologic Carbon Storage (GCS) projects. It specifies that buffer credits must be deposited into the GCS pooled buffer account following the procedures outlined in the VCS Program document on Registration and Issuance Processes. The number of credits to be deposited in the pooled buffer account is determined by the non-permanence risk report assessed by the validation/verification body, in accordance with the requirements outlined in the VCS Standard. Therefore, non-permanence risk adjustments should be evaluated during the project's verification and issuance stages.
Aster Global Findings - Round 2	Section 9.3 has been updated to provide clear requirements for project developers, relating to non-permanence risk and buffer pools. Finding is closed. After the findings were closed, Verra modified the methodology. These changes were driven by Verra requirements, moving guidance to the modules, updating to the current Verra style guide and to align the methodology to the ICVCM.

Item	76
VCS Methodology Requirements v4.4 4 October 2023 (Section)	3.9.1
VCS Methodology Requirements v4.4 4 October 2023 (Description)	The methodology shall describe the data and parameters to be reported, including sources of data and units of measurement.
Evidence Used to Assess (Location in Meth/Module or Supporting Documents)	Data and Parameters Available at Validation - T_stp, P_stp, p_x(stp)
Aster Global Findings - Round 1	The sources of data for each of the first three parameters available at validation is "Industry Practice". It is unclear how a project would use this statement as a source of data.
Round 1 NCR/CL/OFI	CL: Please clarify in line with the finding.
Round 1 Response from Development Team	Tables are revised accordingly. Project developers must identify the reference temperature, pressure and density as per applicable academic resources.
Aster Global Findings - Round 2	Tables are updated. Finding is closed.

Item	77
VCS Methodology Template v4.3 29 August 2023 (Section)	ii)
VCS Methodology Template v4.3 29 August 2023 (Description)	should: indicates a (non-mandatory) recommendation

Evidence Used to Assess (Location in Meth/Module or Supporting Documents)	Project Boundary - Materiality threshold
Aster Global Findings - Round 1	It is unclear to the assessment team if 'should' is the correct keyword to use in this section. This requirement will allow projects to exclude leakage sources that are greater than 2% of the new project emission reductions/removals. It will also allow a projects total leakage to be greater than 2%.
Round 1 NCR/CL/OFI	CL: Please clarify why the keyword 'should' is used in this requirement.
Round 1 Response from Development Team	It has been revised accordingly.
Aster Global Findings - Round 2	Text has been updated. Finding is closed.

Item	78
VCS Methodology Template v4.3 29 August 2023 (Section)	iii)
VCS Methodology Template v4.3 29 August 2023 (Description)	may: indicates a permissible or allowable option
Evidence Used to Assess (Location in Meth/Module or Supporting Documents)	Additionality #6, sub bullet b.
Aster Global Findings - Round 1	It is unclear to the assessment team if 'may' is the correct keyword to use in this requirement.
Round 1 NCR/CL/OFI	CL: Please clarify if the keyword 'may' is being correctly used.
Round 1 Response from Development Team	It has been revised accordingly.
Aster Global Findings - Round 2	Text has been updated. Finding is closed.

Item	79
VCS Methodology Template v4.3 29 August 2023 (Section)	8
VCS Methodology Template v4.3 29 August 2023 (Description)	Use italic font to reference VCS Program documents, methodologies, or tools, e.g., "the latest version of the VCS Methodology Requirements."
Evidence Used to Assess (Location in Meth/Module or Supporting Documents)	Applicability condition #2

Aster Global Findings Round 1	- It is unclear to the assessment team why the tool referenced in the description of this applicability condition is not in italics as per the requirement.
Round 1 NCR/CL/OFI	NCR: Please update to meet the VCS Methodology Template requirement.
Round 1 Response from Development Team	Applicability condition #2 and Section 9.3 have been revised accordingly.
Aster Global Findings Round 2	- Text has been updated. Finding is closed.

Item	80
VCS Methodology Template v4.3 29 August 2023 (Section)	8
VCS Methodology Template v4.3 29 August 2023 (Description)	Use italic font to reference VCS Program documents, methodologies, or tools, e.g., "the latest version of the VCS Methodology Requirements."
Evidence Used to Assess (Location in Meth/Module or Supporting Documents)	Section 9.3 - Description of Monitoring Plan
Aster Global Findings Round 1	- It is unclear to the assessment team why the tools mentioned in first paragraph below the QA/QC procedures in Section 9.3 are not in italics (with VMD numbers) as per the requirement.
Round 1 NCR/CL/OFI	NCR: Please update to meet the VCS Methodology Template requirement.
Round 1 Response from Development Team	Applicability condition #2 and Section 9.3 have been revised accordingly.
Aster Global Findings Round 2	- Text has been updated. Finding is closed.

Item	81
VCS Methodology Template v4.3 29 August 2023 (Section)	4
VCS Methodology Template v4.3 29 August 2023 (Description)	See example on page 8. of VCS Methodology template v4.3
Evidence Used to Assess (Location in Meth/Module or Supporting Documents)	Section 4 - Applicability Conditions
Aster Global Findings Round 1	- It is unclear to the assessment team why inconsistent indenting is used for the applicability conditions. Bullets, and numbering inconsistencies start at bullet 3 and continue through the list.
Round 1 NCR/CL/OFI	CL: Please clarify in line with the finding

Round 1 Response from Development Team	It has been revised accordingly.
Aster Global Findings - Round 2	Text has been updated. Finding is closed.

Item	82
VCS Methodology Template v4.3 29 August 2023 (Section)	
VCS Methodology Template v4.3 29 August 2023 (Description)	Include summary information to describe the context of equations and ensure clarity of the calculation approach.
Evidence Used to Assess (Location in Meth/Module or Supporting Documents)	Section 8.1 - Baseline Emissions
Aster Global Findings - Round 1	It is unclear to the assessment team why the term "BECCS" is mentioned in equation 1, but is not listed as an eligible capture activity.
Round 1 NCR/CL/OFI	CL: Please clarify in line with the finding.
Round 1 Response from Development Team	The BECCS term has been deleted.
Aster Global Findings - Round 2	Text has been updated. Finding is closed.

Item	83
VCS Methodology Template v4.3 29 August 2023 (Section)	
VCS Methodology Template v4.3 29 August 2023 (Description)	Use normal font to write the parameters in the description below the equations. Do not use the "equation function" for the parameter in the description section.
Evidence Used to Assess (Location in Meth/Module or Supporting Documents)	All Equations
Aster Global Findings - Round 1	All parameters in the methodology framework are written with the "equation function".
Round 1 NCR/CL/OFI	NCR: Please bring all parameters inline with the VCS Methodology template requirement.
Round 1 Response from Development Team	It has been revised accordingly.
Aster Global Findings - Round 2	Text has been updated. Finding is closed.

9 APPENDIX C: RESPONSES TO PUBLIC COMMENTS

Item	1
Comment Number	1
Related Document	Methodology for CCS
Entity	Devitec-ESG
Section	5 - Project Boundary
Page number	10
Type of Comment	General Feedback
Comment	in the first paragraph, include injection points, which could be not close to the storage site
Cluster	E
Response from Methodology Developer	The current methodology's definition of the spatial extent of the project boundary is designed to be comprehensive. It incorporates "sites, leases, rights-of-way, areas of review, and other land areas needed to operate and monitor the project." This definition implicitly covers all necessary operational areas, including injection points.
Aster Global Findings - Round 1	The developer demonstrated the irrelevance of the comment by pointing out the boundary is written to include all areas of significance which would include injection points. After the findings were closed, Verra modified the methodology. These changes were driven by Verra requirements, moving guidance to the modules, updating to the current Verra style guide and to align the methodology to the ICVCM.

Item	2
Comment Number	2
Related Document	Methodology for CCS
Entity	Devitec-ESG
Section	7 - Additionality
Page number	14
Type of Comment	Proposed Change
Comment	in 3) you have to clarify the timeframe to prorate the capital costs, it should be the depreciation span of the asset, even the lifetime is higher
Cluster	F
Response from Methodology Developer	Project developers must follow the investment analysis as per step 2 in the latest version of CDM Tool 01, "Tool for the demonstration and assessment of additionality," and CDM Tool 27, "Investment Analysis." The CDM Tool 27 emphasizes the importance of assessing the financial viability of the project activity over its expected operational period or technical lifetime. If a shorter timeframe than the technical lifetime is chosen, the analysis must be conducted for at least 10 years. It must include the fair value of the project activity assets at the end of that period.
Aster Global Findings - Round 1	The methodology developer updated the additionality section, clarifying the options and streamlining the process. No further action is needed

Item	3
Comment Number	3
Related Document	Methodology for CCS
Entity	Devitec-ESG

Section	7 - Additionality
Page number	15
Type of Comment	Proposed Change
Comment	6)c) is not clear at all. The facility usually has to invest in a electrostatics or bags collectors and add limestone to collect particulate and sulphur if Coal is used. So, the savings must be specified as a max % of this cleaning system (mandatory by law)
Cluster	F
Response from Methodology Developer	<p>CDM Tool 27 (Version 13.0) emphasizes the need for a detailed investment analysis that includes both project IRR and equity IRR calculations over the period of expected operation or a minimum of 10 years, considering the fair value of project activity assets at the end of the assessment period (Section 4, Paragraph 6). This requirement underscores the importance of capturing all relevant financial impacts over the project's lifetime, including savings from operational efficiencies or compliance with regulations.</p> <p>In addition to that the CDM tool specifies that the fair value of project assets at the end of the assessment period should be included as a cash inflow, suggesting a comprehensive approach to capturing all financial benefits, including savings (Section 4, Paragraph 7). Therefore it can be argued that savings should be incorporated directly into the cash flows, to ensure that IRR analysis fully accounts for the financial benefits of the project.</p> <p>Furthermore the CDM tool specifies conducting investment analysis with post-tax cash flows, including the cash flow effects of taxation in the IRR/NPV calculation (Section 4, Paragraph 9). This aligns with the approach of incorporating actual savings into the analysis, as savings from operational efficiencies or regulatory compliance can significantly impact post-tax cash flows.</p> <p>In conclusion, approach for incorporating actual savings into the IRR analysis is not only consistent with but also reinforced by the CDM tool. This approach ensures a comprehensive, transparent, and robust financial evaluation of the project, highlighting its adherence to the principles and requirements set forth by the CDM tool.</p>
Aster Global Findings Round 1	- The methodology developer updated the additionality section, clarifying the options and streamlining the process. No further action is needed

Item	4
Comment Number	4
Related Document	Methodology for CCS
Entity	Devitec-ESG
Section	7 - Additionality
Page number	16
Type of Comment	Proposed Change
Comment	The first bullet is subjective about the complexity and commercial scale. I suggest to indicate a global market penetration below 2% or similar concept to avoid misunderstandings
Cluster	F

Response from Methodology Developer	The methodology has been constructed to ensure comprehensive and rigorous assessment while remaining adaptable to various scenarios. The methodology does not solely rely on the first bullet about technological maturity and commercial scale. Instead, it provides a multi-step process to determine additionality, encompassing regulatory surplus, implementation barriers, and common practice considerations. This multi-faceted approach ensures that no single subjective criterion is a determining factor. The "Selection and validation of appropriate benchmark" section highlights the need to consider risks associated with investing in various scenarios, including immature technologies or complex systems. Including internal company benchmarks/expected returns based on past experiences and similar risks provides an empirical basis for assessment. This minimizes subjectivity and offers a more consistent evaluation framework.
Aster Global Findings Round 1	The methodology developer updated the additionality section, clarifying the options and streamlining the process. No further action is needed. After the findings were closed, Verra modified the methodology. These changes were driven by Verra requirements, moving guidance to the modules, updating to the current Verra style guide and to align the methodology to the ICVCM.

Item	5
Comment Number	5
Related Document	Methodology for CCS
Entity	Devitec-ESG
Section	7 - Additionality
Page number	16
Type of Comment	Proposed Change
Comment	a "business models with limited experience" is very subjective for investments of hundred of millions. Moreover, the primary technologies for gathering, compressing, regenerating and injecting are old and well proven. The Energy firms usually build the project with many contracts from experienced international companies. The only limited experience could be from the local contractors, but very difficult to believe in a business model with limited experience. A clarification is needed with a good example
Cluster	F
Response from Methodology Developer	Currently, only 30 capture facilities with a total capture capacity of merely 42.5 million tons per year are operational, mostly in the US (https://status22.globalccsinstitute.com/wp-content/uploads/2022/11/Global-Status-of-CCS-2022_Download.pdf). The majority of large-scale CCS projects built over the last decade have been a commercial failure. They are either out of service or significantly performing below expectations. Examples are the Petro Nova project and Boundary Dam project in the US (https://sgp.fas.org/crs/misc/R44902.pdf). Hence, it is a fair statement to say that there is limited experience with the business model.

Aster Global Findings Round 1	<p>The methodology developer updated the additionality section, clarifying the options and streamlining the process. No further action is needed.</p> <p>After the findings were closed, Verra modified the methodology. These changes were driven by Verra requirements, moving guidance to the modules, updating to the current Verra style guide and to align the methodology to the ICVCM.</p>
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Item	6
Comment Number	6
Related Document	Methodology for CCS
Entity	Devitec-ESG
Section	7 - Additionality
Page number	16
Type of Comment	Proposed Change
Comment	<p>The 21% will be controversial as this is based on a single paper that does not represent Oil & Gas or Energy. The starting point is to differentiate the benchmarking for upstream and downstream business. A gas fired downstream business in power usually operates around 12%, you can confirm this with corporate reports of global operators. The upstream for pipelines and reservoirs must be higher as this has usually higher risks, not less than 18% in OECD countries and you can add country risk to modulate the risk. in general, this analysis is complex and requires a division of the value chain and risks approaches</p>
Cluster	F

Response from Methodology Developer	<p>Currently, only 30 capture facilities with a total capture capacity of merely 42.5 million tons per year are currently operational (https://status22.globalccsinstitute.com/wp-content/uploads/2022/11/Global-Status-of-CCS-2022_Download.pdf). Most large-scale CCS projects built over the last decade have been a commercial failure. They are either out of service or significantly performing below expectations. Examples are the Petro Nova project and Boundary Dam project in the US (https://sgp.fas.org/crs/misc/R44902.pdf). Therefore, those projects need to be considered as high risk investment projects similar to venture capital investments. In "How Venture Capital Works" Bob Dizer highlights that the venture capital model is designed to commercialize technologies, some of which might have previously remained dormant in corporations or academia.</p> <p>The methodology uses a comprehensive multi-step approach to assess additionality, including regulatory surplus, implementation barriers, and common practice considerations. The 21% value is explicitly applied when a company has no prior experience undertaking projects with technologies/business models with risks similar to the project activity. It is intended to serve as a proxy for the returns expected when applying the Investment Analysis for the project activity.</p> <p>The choice to use venture capital investments as a reference point stems from the inherently high risks associated with such investments, even if they are undertaken by large energy companies. The document "How Venture Capital Works" presents a range of IRR values over five years, which span from 0% to 50%. This range offers a broad spectrum of potential returns, indicating the variability and uncertainty inherent in the venture capital landscape. 21% fits within this spectrum, closer to the mid-range. The methodology suggests that an IRR benchmark of 21% would be a reasonably robust return, especially considering the higher end of the scale is 50%.</p> <p>Furthermore, the methodology prioritizes using internal company benchmarks/expected returns. These benchmarks reflect risks related to specific project scenarios, such as immature technologies or systems of notable complexity. Such benchmarks are derived from the company's prior investments in activities with similar risks. Hence, the methodology is sensitive to individual projects' specific characteristics and risks.</p>
Aster Global Findings - Round 1	<p>The methodology developer addresses the commenters concern by clarifying the 21% IRR would not be prioritized over the internal company benchmarks/expected returns.</p> <p>After the findings were closed, Verra modified the methodology. These changes were driven by Verra requirements, moving guidance to the modules, updating to the current Verra style guide and to align the methodology to the ICVCM.</p>

Item	7
Comment Number	11
Related Document	Methodology for CCS
Entity	(publish as anonymous)
Section	5 - Project Boundary
Page number	11
Type of Comment	General Feedback
Comment	We recommend to use market based instruments and life cycle assessment to account the emissions associated with energy usage e.g. electricity
Cluster	E

Response from Methodology Developer	As detailed in the modules, CCS+ employs location-specific emission factors for electricity consumption, reflecting a commitment to accurately assessing the emissions originated from energy used by the project. This approach is consistent with LCA principles by ensuring that we account for emissions across the entire lifecycle of energy consumption, from production through to end use. It encompasses both direct operational emissions and upstream emissions, offering a holistic view of electricity emissions
Aster Global Findings - Round 1	The developers response took due account of the comment and pointed out that the current method for calculating emissions associated with electricity consumption (direct, and upstream) is consistent with LCA principles and fully accounts for electricity associated emissions

Item	8
Comment Number	12
Related Document	Methodology for CCS
Entity	(publish as anonymous)
Section	7 - Additionality
Page number	15
Type of Comment	General Feedback
Comment	"7) Payments from the capture facilities to the source facilities for the CO2 captured are not considered costs in the investment analysis." We appreciate that 7) avoids an alleged additionality, which could result from using artificially high CO2 prices. However, one needs to take into account that opportunity costs e.g. from CCU prices will affect the CCS volumes if such cost is excluded.
Cluster	F
Response from Methodology Developer	As laid out in point 7, the methodology intends to ensure that the financial analysis remains as objective as possible by excluding payments from the capture facilities to the source facilities for the CO2 captured. This is to avoid inflating the perceived financial viability of a project through potentially high CO2 prices, which could artificially enhance the project's attractiveness and challenge the genuine additionality. The methodology aims to provide a framework that can be applied across various projects. While we acknowledge that different projects may have varying opportunity costs, our goal is to maintain a consistent basis for the assessment. By excluding these payments, we ensure that the analysis focuses on the fundamental economic viability of the project without being influenced by fluctuating or artificial CO2 pricing. However, it's worth noting that while these payments are excluded from the investment analysis, they are not disregarded entirely. Such considerations can be factored in sensitivity analyses, but for the primary investment analysis, we believe it's crucial to maintain a consistent foundation.
Aster Global Findings - Round 1	The methodology developer updated the additionality section, clarifying the options and streamlining the process. No further action is needed

Item	9
Comment Number	13
Related Document	Methodology for CCS

Entity	(publish as anonymous)
Section	7 - Additionality
Page number	17
Type of Comment	Proposed Change
Comment	<p>Definition of "common practice": We appreciate to develop a robust CCS+ methodology with strict requirements. However, the definition of common practice by using a threshold of only 20% will hinder the development of such removal activities, needing revenues e.g. from CCS+ conform credits: We are addressing this from the point of view as a Biomethane producer, being able to capture CO2 from the biogas production process (BECCS), operating and building plants in different markets. The definition of 20% in a sector and country will lead to situations, in which only a very few numbers of projects can be eligible. This number is assumingly too small to start such developments , since high development cost requires to build a certain number of plants.</p> <p>We consider a technology which is used at > 80% of all plants in a sector/country to be common practice. At least, the majority of the plants (> 50%) are required to regard a practice as common. We ask to increase the threshold of 20% at least to 50%, since this is still a very strict criterion for additionality.</p>
Cluster	F
Response from Methodology Developer	<p>Our decision to set the threshold at 20% for defining common practice is based on the intention to uphold the integrity and credibility of carbon credits. Additionally, it's worth noting that the CDM Tool 24 "Common Practice" also employs a factor of 0.2 (20%) for determining common practice. The granularity of our approach ensures the 20% criterion is applied distinctly across sectors and countries. In regions where BECCS is in its infancy, projects can still qualify as additional, even if they are prevalent elsewhere. This country-specific approach accommodates different regions' challenges, regulatory landscapes, and market conditions. Also note that our framework excludes similar projects under validation, awaiting registration, or registered under any GHG crediting program from the common practice analysis. This means that only non-carbon crediting BECCS projects will be counted towards the 20% market penetration.</p>
Aster Global Findings Round 1	- The methodology developer updated the additionality section, clarifying the options and streamlining the process. No further action is needed

Item	10
Comment Number	14
Related Document	Methodology for CCS
Entity	(publish as anonymous)
Section	8.1 - Baseline Emissions
Page number	17/18
Type of Comment	Proposed Change

Comment	<p>General feedback: We appreciate the goal of CCS+ to find simple standard approaches. However, the reliable determination of the removed CO2 quantity is crucial and we would like to contribute with comments to avoid any reputational risk.</p> <p>The methodology intends to propose one standard method for all individual cases, which is an enormous challenge. Since CCS will happen in a large variety of applications with numerous, physically different substances, standard models can reach easily the limit of validity. Moreover, a definition of physical conditions in which phase or temperature/pressure range measurements have to be carried out, could be helpful.</p> <p>Due to the significant variety of projects and technologies, it could be a solution to require a clear limit for the accuracy (e.g. measured tons need to be accurate by x%) instead of defining methods. Since we assume that this would reduce reputational risks and foster the credibility, we propose CCS+ to discuss such an alternative with technical experts.</p>
Cluster	G
Response from Methodology Developer	In line with VERRA's requirements, the methodology aims to minimize systematic and random errors as extensively as possible. To this end, methodology developers are mandated to conduct a thorough uncertainty assessment. This assessment is then presented to VERRA and the designated VVB to ensure that the uncertainty of the methodology remains within the prescribed confidence interval.
Aster Global Findings Round 1	The developers response took due account of the comment by referencing the analysis done to minimize systematic error; however, the assessment team has not seen the uncertainty assessment. Please provide the uncertainty assessment.
Aster Global Round 1 Findings (NCR/CL/OFI)	CL: Please clarify in line with the finding.
Round 1 Response from Methodology Developer	To address the uncertainty for each project, uncertainty assessment is added to the methodology. Project developers require to do an uncertainty assessment and if it is below defined threshold by the methodology requirements, then project developers must apply a discount factor to the net removals and reductions.
Aster Global Round 2 Findings (NCR/CL/OFI)	The assessment team reviewed the updated uncertainty section in the methodology. Finding is closed.

Item	11
Comment Number	15
Related Document	Methodology for CCS
Entity	(publish as anonymous)
Section	8.1.1 - Methods for CO2 Measurement
Page number	18
Type of Comment	Proposed Change
Comment	The concept describes in detail the procedure for flow management. There will be projects in which the CO2 quantity can be determined from weighing, e.g. in case of CO2 liquefaction and transport in containers. For the avoidance of doubt it should be clarified that other methods than flow measurements can be used.

Cluster	G
Response from Methodology Developer	The methodology details the approaches for measuring CO ₂ via mass flow or volumetric flow rate. So only mass and volumetric approach is applicable as defined in the section 8.1 of the methodology.
Aster Global Findings - Round 1	The Methodology developers response does not address the commenters suggestion to expand the measurement methods section to include weighing of liquified CO ₂
Aster Global Round 1 Findings (NCR/CL/OFI)	CL: Please clarify in line with the finding.
Round 1 Response from Methodology Developer	For the quantification of the CO ₂ only mass flow or volumetric flow can be used. Therefore weighing is not applicable.
Aster Global Round 2 Findings (NCR/CL/OFI)	Only mass and volumetric flow measurement methods are allow. Finding is closed.

Item	12
Comment Number	16
Related Document	Methodology for CCS
Entity	(publish as anonymous)
Section	8.1.2 - Measurement Based on Mass Flow Rate
Page number	19
Type of Comment	Proposed Change
Comment	<p>Equation (3) seems to be mathematically insufficiently defined: Impurities of less than 0,5% are excluded from the fraction denominator. Consequently, the CO₂ volumes will be overstated by the total percentage of the neglected impurities. (Example: if 4 components with a fraction of 0,45% each are neglected, the denominator will have a value of 0,982. If the CO₂ fraction is e.g. 95%, the denominator will result in a corrected CO₂ fraction of 96,7% and thus overestating the removed emission by 1%. This might be within the total uncertainty (which we could not find in the document), but since less favorable values can occur and the equation will always overstate the removal, this could end up in a reputational risk.</p> <p>The problem raised could be solved e.g. by introducing a correction factor in the formula or changing the rules about impurities, e.g. by limiting the total fraction of neglected impurities must not exceed a value of a certain percentage.</p>
Cluster	G

Response from Methodology Developer	<p>The methodology set forth is based on practical considerations. Neglecting less than 0.5% impurities simplifies the calculations while reasonably accurately representing actual conditions. In the "Methods for CO2 measurement" subsection, the text provides guidelines for measuring CO2, considering the potential inaccuracies due to impurities, especially for supercritical phase CO2. Moreover, the fraction values used (0.5% and 0.25%) are industry standards and are often deemed acceptable for such calculations.</p> <p>However, your argument regarding the cumulative effect of multiple impurities, each below the 0.5% threshold, is valid. This could lead to overestimating CO2 quantities, especially in scenarios with multiple impurities close to the threshold. We propose introducing a threshold. This can be done by ensuring that the total cumulative fraction of impurities neglected should not exceed a certain threshold, (2%.)</p> <p>Text has been revised based on the comment: "In Equation (3), while individual impurities with a mole fraction of less than 0.5% can be neglected, the cumulative mole fraction of all neglected impurities should not exceed a predefined threshold (2%)."</p>
Aster Global Findings Round 1	The development team updated the methodology by adding a limit of 2% for cumulative neglected impurities which aligns with the suggestion by the commentor

Item	13
Comment Number	17
Related Document	Methodology for CCS
Entity	(publish as anonymous)
Section	8.1.3 - Measurement Based on Volumetric Flow Rate
Page number	19
Type of Comment	General Feedback
Comment	Equation (4) requires to investigate the loss of accuracy because of the chosen simplification: The equation assumes ideal gas behavior of the mixture and assumes that the real gas behavior of the mixture is equal to the real gas behavior of CO2. Density deviations can be significantly, depending on pressure, temperature and the components in the mixtures.
Cluster	G

Response from Methodology Developer	Methodology aims to balance precision with practicality, employing simplifications that align with standard industry practices for GHG quantification while ensuring a reasonable degree of accuracy. Specifically, we reference established standards and employ equations of state or NIST tables to account for real gas behavior, particularly for CO2 density calculations, which are crucial for accurate emissions accounting. This approach allows us to accommodate variations in gas behavior under different conditions effectively. (https://nepis.epa.gov/Exe/ZyNET.exe/P1010C7P.TXT?ZyActionD=ZyDocument&Client=EPA&Index=2006+Thru+2010&Docs=&Query=&Time=&EndTime=&SearchMethod=1&TocRestrict=n&Toc=&TocEntry=&QField=&QFieldYear=&QFieldMonth=&QFieldDay=&IntQFieldOp=0&ExtQFieldOp=0&XmlQuery=&File=D%3A%5Czyfiles%5CIndex%20Data%5C06thru10%5Ctxt%5C00000044%5CP1010C7P.txt&User=ANONYMOUS&Password=anonymous&SortMethod=h%7C-&MaximumDocuments=1&FuzzyDegree=0&ImageQuality=r75g8/r75g8/x150y150g16/i425&Display=hpfr&DefSeekPage=x&SearchBack=ZyActionL&Back=ZyActionS&BackDesc=Results%20page&MaximumPages=1&ZyEntry=1&SeekPage=x&ZyPURL)
Aster Global Findings Round 1	It is unclear to the assessment team how the response addresses the commenters request to investigate the loss of accuracy due to simplification. The assessment team notes that the provided URL does not link to a webpage so this portion of the response was not reviewed.
Aster Global Round 1 Findings (NCR/CL/OFI)	CL: Please clarify in line with the finding and the original comment.
Round 1 Response from Methodology Developer	To address the loss of accuracy uncertainty assessment is added to the methodology. Correct link is: https://webbook.nist.gov/chemistry/fluid/
Aster Global Round 2 Findings (NCR/CL/OFI)	The assessment team reviewed the updated uncertainty section in the methodology, and the monitoring requirements for volumetric flow measurements and is reasonably assured that the combined methods are adequate for CO2 flow measurement. Finding is closed.

Item	14
Comment Number	18
Related Document	Methodology for CCS
Entity	(publish as anonymous)
Section	8.1.3 - Measurement Based on Volumetric Flow Rate
Page number	20
Type of Comment	Proposed Change
Comment	Equation (5): please see comments to equation (3) to sec 8.1.2
Cluster	G

<p>Response from Methodology Developer</p>	<p>Please refer to response no 16.</p> <p>"The methodology set forth is based on practical considerations. Neglecting less than 0.5% impurities simplifies the calculations while reasonably accurately representing actual conditions. In the "Methods for CO2 measurement" subsection, the text provides guidelines for measuring CO2, considering the potential inaccuracies due to impurities, especially for supercritical phase CO2. Moreover, the fraction values used (0.5% and 0.25%) are industry standards and are often deemed acceptable for such calculations.</p> <p>However, your argument regarding the cumulative effect of multiple impurities, each below the 0.5% threshold, is valid. This could lead to overestimating CO2 quantities, especially in scenarios with multiple impurities close to the threshold. We propose introducing a threshold. This can be done by ensuring that the total cumulative fraction of impurities neglected should not exceed a certain threshold, (2%.)</p> <p>Text has been revised based on the comment: "In Equation (3), while individual impurities with a mole fraction of less than 0.5% can be neglected, the cumulative mole fraction of all neglected impurities should not exceed a predefined threshold (2%)."</p>
<p>Aster Global Findings Round 1</p>	<p>The development team updated the methodology by adding a limit of 2% for cumulative neglected impurities which aligns with the suggestion by the commentor</p>

<p>Item</p>	<p>15</p>
<p>Comment Number</p>	<p>19</p>
<p>Related Document</p>	<p>Methodology for CCS</p>
<p>Entity</p>	<p>(publish as anonymous)</p>
<p>Section</p>	<p>8.1.3 - Measurement Based on Volumetric Flow Rate</p>
<p>Page number</p>	<p>20</p>
<p>Type of Comment</p>	<p>General Feedback</p>
<p>Comment</p>	<p>Equation (6) requires to investigate the loss of accuracy because of the chosen simplification: Impurities can have a completely different effect on the density/pressure/temperature relation at the operating point compared to the standard conditions. The equation assumes a negligible effect, which should not be assumed in general.</p>
<p>Cluster</p>	<p>G</p>

Response from Methodology Developer	<p>Please refer to response no 16.</p> <p>"The methodology set forth is based on practical considerations. Neglecting less than 0.5% impurities simplifies the calculations while reasonably accurately representing actual conditions. In the "Methods for CO2 measurement" subsection, the text provides guidelines for measuring CO2, considering the potential inaccuracies due to impurities, especially for supercritical phase CO2. Moreover, the fraction values used (0.5% and 0.25%) are industry standards and are often deemed acceptable for such calculations.</p> <p>However, your argument regarding the cumulative effect of multiple impurities, each below the 0.5% threshold, is valid. This could lead to overestimating CO2 quantities, especially in scenarios with multiple impurities close to the threshold. We propose introducing a threshold. This can be done by ensuring that the total cumulative fraction of impurities neglected should not exceed a certain threshold, (2%.)</p> <p>Text has been revised based on the comment: "In Equation (3), while individual impurities with a mole fraction of less than 0.5% can be neglected, the cumulative mole fraction of all neglected impurities should not exceed a predefined threshold (2%)."</p>
Aster Global Findings Round 1	It is unclear to the assessment team how the developers response limiting neglected impurities addresses the commentors concerns related to impurities effects on density/pressure/temperature.
Aster Global Round 1 Findings (NCR/CL/OFI)	CL: Please clarify in line with the finding.
Round 1 Response from Methodology Developer	By limiting the impurities, uncertainties from impurities can be kept at minimum level. In addition to that to address the loss of accuracy uncertainty assessment is added to the methodology.
Aster Global Round 2 Findings (NCR/CL/OFI)	The assessment team reviewed the updated uncertainty section in the methodology, and the monitoring requirements for volumetric flow measurements and is reasonably assured that the combined methods are adequate for CO2 flow measurement. Finding is closed.

Item	16
Comment Number	20
Related Document	Methodology for CCS
Entity	ClonBio Group & Ethanol Europe
Section	4 - Applicability Conditions
Page number	4
Type of Comment	General Feedback
Comment	'Project activities must transport the project CO2 stream to storage sites that are not co-located or are not adjoining the capture sites using an eligible transport activity.' I do not see why to exclude CO2 sources sitting on top a suitable storage site
Cluster	D

Response from Methodology Developer	<p>The current framework ensures the safe and efficient transport of captured CO2 to eligible storage sites, particularly when these sites are not co-located or directly adjacent to the capture facilities. As detailed in the applicability conditions, project activities must encompass both an eligible capture and storage activity. However, if the storage site is co-located or directly adjacent to the capture site, there is no requirement for a separate transport activity.</p> <p>Text has been revised based on the comment: “Project activities must include at least one eligible capture activity and at least one eligible storage activity. If the project activity is not co-located or not adjoining the capture site, it must use an eligible transport activity. However, in situations where the storage sites are co-located or are adjoining the capture sites, the capture module boundary is directly attached to the storage module boundary, and thus, the project proponent could cover all equipment under one project boundary without defining a separate module boundary for transport.”</p>
Aster Global Findings - Round 1	<p>The methodology developer has revised the language to make it more clear that a transport activity is not required if the capture and storage sites are co-located or are adjoining.</p> <p>After the findings were closed, Verra modified the methodology. These changes were driven by Verra requirements, moving guidance to the modules, updating to the current Verra style guide and to align the methodology to the ICVCM.</p>

Item	17
Comment Number	21
Related Document	Methodology for CCS
Entity	ClonBio Group & Ethanol Europe
Section	7 - Additionality
Page number	17
Type of Comment	General Feedback
Comment	<p>Regarding additionality I believe this bar may be too low. In a relatively short time, US ethanol industry would not qualify as additional, as more than one fifth will be coupled with CCS (connected to a pipeline or stand alone).</p> <p>‘The project must not be common practice, determined for each capture activity included or added as expansion as follows: 1) The project type must not be common practice in the respective sector and country. • Common practice is defined as the project activity implemented in more than 20% of comparable source facilities in the sector and country.’</p>
Cluster	F

Response from Methodology Developer	<p>Please refer to response no. 13.</p> <p>"Our decision to set the threshold at 20% for defining common practice is based on the intention to uphold the integrity and credibility of carbon credits. Additionally, it's worth noting that the CDM Tool 24 "Common Practice" also employs a factor of 0.2 (20%) for determining common practice. The granularity of our approach ensures the 20% criterion is applied distinctly across sectors and countries. In regions where BECCS is in its infancy, projects can still qualify as additional, even if they are prevalent elsewhere. This country-specific approach accommodates different regions' challenges, regulatory landscapes, and market conditions. Also note that our framework excludes similar projects under validation, awaiting registration, or registered under any GHG crediting program from the common practice analysis. This means that only non-carbon crediting BECCS projects will be counted towards the 20% market penetration. "</p>
Aster Global Findings Round 1	- The methodology developer updated the additionality section, clarifying the options and streamlining the process. No further action is needed

Item	18
Comment Number	22
Related Document	Methodology for CCS
Entity	Carbon Direct Inc.
Section	General
Page number	
Type of Comment	General Feedback
Comment	<p>Should CCS have a buffer pool? No. CCS projects should not be subject to a buffer pool. Project design, long term monitoring and adequate insurance should be designed to handle the low-probability, high-consequence risk of reversal through geologic leakage. A buffer pool, such as those used in forestry projects, is not an appropriate alternative to insurance for geologic storage.</p> <p>In short, rocks are not trees.</p>
Cluster	K
Response from Methodology Developer	Buffer pool is related to the VCS program change. Comment is forwarded to VERRA. Question is not relevant to this public consultation.
Aster Global Findings Round 1	- The development team took due account of the comment by forwarding the request to replace buffer pools with insurance for geologic storage as this requirement is determined by Verra and not the development team.

Item	19
Comment Number	23
Related Document	Methodology for CCS
Entity	Carbon Direct Inc.
Section	General
Page number	
Type of Comment	General Feedback

<p>Comment</p>	<p>The rigorous separation between atmospheric, biogenic and fossil CO2 in the accounting for CO2 flows stored based on metering with high accuracies? Yes. There must be a rigorous differentiation between carbon that is sequestered from the three different carbon pools identified here.</p> <p>Atmospheric carbon removal to geologic storage leaves little uncertainty in additionality, baselines, or counterfactuals, and needs only rigorous project monitoring, measurement, recording, and verification (MMRV) and accounting to quantify the net removal.</p> <p>Capture and sequestration of biogenic carbon is complicated by the counterfactual (what would have happened to that carbon had the project not been built - which may be confounded by the science of degradation estimates), the subtle differences between reductions and removals owing to how biomass is treated in GHG inventories, land-use concerns, and the additionality of some “low hanging fruit” projects.</p> <p>CCS on power and industrial plants is a straightforward reduction. The registration of credits via these projects will be subject to a clear double-counting scrutiny that is not applicable to atmospheric and biogenic carbon removals.</p> <p>For cases with co-injection of fossil and atmospheric or biogenic CO2, rigorous differentiation needs to be realized by transparent MMRV protocols, and must be based on accurate metering.</p> <p>It should be considered to separate certifications for: Atmospheric CO2 capture Storage of atmospheric CO2 Biogenic CO2 capture Storage of biogenic CO2 Fossil CO2 capture Fossil CO2 storage.</p>
<p>Cluster</p>	<p>K</p>
<p>Response from Methodology Developer</p>	<p>Please refer to response no 116. "Carbon Dioxide Removal (Removal) is defined by VERRA as a long-term atmospheric benefit that is attributable to project activities. These activities are known to increase durably-stored carbon stocks in geological, terrestrial, ocean, or product carbon pools, net of associated project and leakage emissions. It is characterized by the anthropogenic enhancement of biological or geochemical sinks and the transfer of biogenic carbon from short-term to long-term carbon pools. The exclusion of natural CO2 uptake and the maintenance of declining carbon stocks is specified. It is represented that one metric tonne of CO2 removed from the atmosphere corresponds to one carbon dioxide removal. An elaborate procedures for calculating both Greenhouse Gas (GHG) emission reductions ("reductions") and carbon dioxide removals ("removals") from eligible project activities is provided by the VT00XX: Tool for Differentiating Reductions and Removals in CCS Projects . "</p>

Aster Global Findings Round 1	-	The development team correctly identifies the VERRA definitions for removals vs reductions, but it is unclear to the assessment team how the development teams response addresses the commenters concern over how the sources of CO2 (atmospheric, biogenic, and fossil) are handled within the methodology framework.
Aster Global Round Findings (NCR/CL/OFI)	1	CL: Please clarify in line with the finding and the original comment.
Round 1 Response from Methodology Developer		Baseline differentiation for removals and reductions and project and leakage emission calculations are provided in the Tool for Differentiating Reductions and Removals in CCS Projects. Therefore commentor should wait for the tool or comment the tool in the public consultation for the batch 2.
Aster Global Round Findings (NCR/CL/OFI)	2	Text has been added to the methodology to clearly define how reductions and removals should be handled by project developers. Finding is closed.

Item	20	
Comment Number	24	
Related Document	Methodology for CCS	
Entity	Carbon Direct Inc.	
Section	General	
Page number		
Type of Comment	General Feedback	
Comment	The inclusion of biogenic and fossil CO2-e emissions in LCA accounting from fuels and utilities used in the processes and their supply chains. Yes. Next to the differentiation of sequestered CO2, the methodologies for LCA accounting for attributed emissions/embodyed CO2 (from fuels, utilities, feedstock used in the processes and their supply chains) should quantify and differentiate between biogenic and fossil CO2-e emissions .	
Cluster	J	
Response from Methodology Developer	Please refer to response no 116. "Carbon Dioxide Removal (Removal) is defined by VERRA as a long-term atmospheric benefit that is attributable to project activities. These activities are known to increase durably-stored carbon stocks in geological, terrestrial, ocean, or product carbon pools, net of associated project and leakage emissions. It is characterized by the anthropogenic enhancement of biological or geochemical sinks and the transfer of biogenic carbon from short-term to long-term carbon pools. The exclusion of natural CO2 uptake and the maintenance of declining carbon stocks is specified. It is represented that one metric tonne of CO2 removed from the atmosphere corresponds to one carbon dioxide removal. An elaborate procedures for calculating both Greenhouse Gas (GHG) emission reductions ("reductions") and carbon dioxide removals ("removals") from eligible project activities is provided by the VT00XX: Tool for Differentiating Reductions and Removals in CCS Projects ."	
Aster Global Findings Round 1	-	The development team took due account of the comment by clearly explaining the differences between reductions and removals as defined by VERRA, and pointing out the tool which will be used to help project developers track removals/reductions during a CCS project.

Item	21
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Comment Number	25
Related Document	Methodology for CCS
Entity	Carbon Direct Inc.
Section	General
Page number	
Type of Comment	General Feedback
Comment	Methodology should be open to be used by other certifiers and registers than Verra. In line with CCS+ aspiration that the CCS+ Initiative methodologies will exist as a public good, they should be open for use by other certifiers and registers.
Cluster	K
Response from Methodology Developer	Comment is forwarded to VERRA. Question is not relevant to this public consultation.
Aster Global Findings - Round 1	The development team took due account of the comment by forwarding the response to VERRA, and the assessment team notes that this comment is not requesting a change or commenting on the methodology, but is suggesting for the methodology to be used by other registries.

Item	22
Comment Number	26
Related Document	Methodology for CCS
Entity	Carbon Direct Inc.
Section	General
Page number	
Type of Comment	General Feedback
Comment	Emissions from fabrication/construction are an integral part of the LCA but are not included. There are some small components in the leakage calculations, but these do not appear to be adequate for standard GHG accounting. The proposed leakage calculations will need to be refined and focused, and separate calculations should be included for fabrication / construction / disposal / decommissioning applications. For example, no emissions or impacts are currently included under the methodology with regards to disposal of spent sorbent, concrete, steel, plastic for facility construction, etc.
Cluster	E

Response from Methodology Developer	VCS Methodology Requirements v 4.4, particularly paragraph 3.7.3, permits the exclusion of leakage sources deemed de minimis, i.e., insignificant to the overall GHG emission profile of a project. VCS Methodology Requirements also refers to the CDM A/R methodological tool, "Tool for testing significance of GHG emissions in A/R CDM project activities," to determine the significance of the leakage emission source. According to this tool, GHG emission sources may be considered negligible if they account for less than 5% of the total decreases in carbon pools and increases in emissions or less than 5% of net anthropogenic removals by sinks, opting for the lower threshold. In the development of the CCS Methodology, a detailed analysis was undertaken to ensure that emissions from fabrication, construction, disposal, and decommissioning fell below this significance threshold. To adopt a conservative approach and ensure that the methodology remains focused on the most substantial emissions, the de minimis threshold was adjusted from the suggested 5% to a more stringent 2%. This decision was made to prioritize accuracy in GHG accounting while maintaining practicality and feasibility in project implementation and monitoring.
Aster Global Findings Round 1	The developers took due account of the comment and detailed the steps taken to ensure conservativeness by lowering the CDM recommended de minimis threshold from 5% to 2%. The developers also detailed the analysis which excluded the emissions associated with construction/fabrication.

Item	23
Comment Number	27
Related Document	Methodology for CCS
Entity	Carbon Direct Inc.
Section	1 - Sources
Page number	3
Type of Comment	General Feedback
Comment	The "Capture Modules" does not include oceanic removals (direct removal of CO2 from oceanwater). Does this fall under one of the other modules (industrial, biogenic)?
Cluster	D
Response from Methodology Developer	The current capture module for public consultation focuses solely on Direct Air Capture (DAC). While we have plans to develop additional modules under the CCS+ initiative, we currently do not intend to incorporate oceanic removals. However, the modular approach of CCS+ allows for the potential inclusion of new project activities. Question is not relevant to this public consultation.
Aster Global Findings Round 1	The methodology developer answered the commentors question by stating that direct removal of CO2 from oceanwater is not an eligible project activity in the current CCS methodology framework but a module could be developed given the modular approach to the methodology framework.

Item	24
Comment Number	28
Related Document	Methodology for CCS
Entity	Carbon Direct Inc.

Section	8.1 - Baseline Emissions
Page number	
Type of Comment	Proposed Change
Comment	<p>The Intent of DAC is to capture and store atmospheric CO2 for removal (BECCS/BICRS the biogenic CO2)</p> <p>From this perspective and as atmospheric and fossil CO2 ratios will change in Coinjected CO2, a baseline of total CO2 injected is less robust</p> <p>Use a approach based on Gross ("baseline") Atm CO2 captured& conditioned and stored from which project related emissions are subtracted for net. With for coinjected projects a separate Net Fossil CO2 captured&conditioned , against a baseline that this CO2 would not have been emitted</p>
Cluster	G
Response from Methodology Developer	<p>Please refer to response no 77.</p> <p>"The methodology defines the baseline scenario in a manner that reflects the absence of the project activity. For CO2 captured from the atmosphere or point sources, it's assumed that in the absence of the project, these emissions would have been released into the atmosphere or would not be captured.</p> <p>By monitoring the mass of injected CO2 as a proxy for baseline emissions and then deducting project and leakage emissions, the methodology provides a straightforward and effective means of calculating net GHG mitigation outcomes. This reflects a pragmatic approach to accounting, where the focus is on the net difference made by the project, thereby simplifying the monitoring and verification process."</p>
Aster Global Findings Round 1	It is unclear to the assessment team how the developers response addressed the commentors concern that removals will not be calculated correctly when coinjecting CO2 (atmospheric and fossil).
Aster Global Round 1 Findings (NCR/CL/OFI)	CL: Please clarify in line with the finding.
Round 1 Response from Methodology Developer	<p>Please refer to response no 5.</p> <p>Baseline differentiation for removals and reductions and project and leakage emission calculations are provided in the Tool for Differentiating Reductions and Removals in CCS Projects. Therefore commentor should wait for the tool or comment the tool in the public consultation for the batch 2.</p>
Aster Global Round 2 Findings (NCR/CL/OFI)	Text has been added to the methodology to clearly define how reductions and removals should be handled by project developers. Finding is closed.

Item	25
Comment Number	47
Related Document	Methodology for CCS
Entity	Sascha Bussat
Section	1 - Sources
Page number	3
Type of Comment	Proposed Change

Comment	<p>It is unclear, how the additional modules will be organized. What is the difference between industrial processes and oil/gas processing? Why has BECCS an own module? The modules should be organized by their capturing technology. E.g. post-combustion module, pre-combustion module (gas-processing and H2 generation).</p>
Cluster	K
Response from Methodology Developer	<p>The modules' organization is based on the source of emissions and the technology used for capture. Each module explains the scope and applicability of the module however to clarify: Industrial processes vs. Oil/Gas processing: While both are industrial, "industrial processes" refers to emissions from various industrial activities such as cement or steel production. In contrast, "oil/gas processing" targets explicitly oil and gas processing emissions. BECCS have two modules one is for post-combustion the other one is for bioproducts. Given its unique blend of technology and potential for negative emissions, we believe it deserves a dedicated module. Organization by capturing technology: Your suggestion about organizing by capturing technology, like post-combustion or pre-combustion, is valid. Our current approach is designed to align with industry practices and the source of emissions. However, we appreciate your feedback.</p>
Aster Global Findings Round 1	The development team took due account of the comment by clearly explaining the rationale behind the organization of modules, specifically, as the organization relates to the source of emissions.

Item	26
Comment Number	48
Related Document	Methodology for CCS
Entity	Sascha Bussat
Section	1 - Sources
Page number	4
Type of Comment	Proposed Change
Comment	These modules should be combined. There is no difference between these storages. Both are subsurface storages.
Cluster	K
Response from Methodology Developer	We are currently addressing the depleted oil & gas storage under new modules and tools. We also evaluate potential risks associated with combining storage modules in this process. Additionally, we're developing safeguards and setting eligibility conditions to mitigate these risks.
Aster Global Findings Round 1	It is unclear to the assessment team if the developers response is in line with the current path forward for storage modules. Please clarify if potential risks are still being assessed or if a combination of the two storage modules (per the commenters suggestion), is being pursued.
Aster Global Round 1 Findings (NCR/CL/OFI)	CL: Please clarify in line with the finding
Round 1 Response from Methodology Developer	All safeguards are already added to the storage module. And in line with the commentor's suggestion, storage modules are combined.
Aster Global Round 2 Findings (NCR/CL/OFI)	Direction of storage modules has been clarified. Finding is closed.

Item	27
Comment Number	49
Related Document	Methodology for CCS
Entity	Sascha Bussat
Section	1 - Sources
Page number	4
Type of Comment	General Feedback
Comment	There is no physical difference between reduction and removal! Various kinds of projects are subjectively perceived differently, but the most relevant factor is the CO2 content in our atmosphere with or without a carbon credit generating project. Verra should be guided by technical clear defined and measurable factors, not but subjective perceptions.
Cluster	J
Response from Methodology Developer	Please refer to response no 116. "Carbon Dioxide Removal (Removal) is defined by VERRA as a long-term atmospheric benefit that is attributable to project activities. These activities are known to increase durably-stored carbon stocks in geological, terrestrial, ocean, or product carbon pools, net of associated project and leakage emissions. It is characterized by the anthropogenic enhancement of biological or geochemical sinks and the transfer of biogenic carbon from short-term to long-term carbon pools. The exclusion of natural CO2 uptake and the maintenance of declining carbon stocks is specified. It is represented that one metric tonne of CO2 removed from the atmosphere corresponds to one carbon dioxide removal. An elaborate procedures for calculating both Greenhouse Gas (GHG) emission reductions ("reductions") and carbon dioxide removals ("removals") from eligible project activities is provided by the VT00XX: Tool for Differentiating Reductions and Removals in CCS Projects . "
Aster Global Findings Round 1	The development team took due account of the comment by clearly explaining the differences between reductions and removals as defined by VERRA. The last sentence of the comment is directed to VERRA.

Item	28
Comment Number	50
Related Document	Methodology for CCS
Entity	Sascha Bussat
Section	2 - Summary Description of the Methodology
Page number	4
Type of Comment	General Feedback
Comment	I could not find a precise definition of reduction and removal within Verra. As long as humans emit GHG, there is no removal. Removal must be seen as post-reduction. There is a risk that the differentiation leads to a reduced support for crucial reduction projects. A better way to differentiate between projects, would be to consider their energy consumption.
Cluster	J

Response from Methodology Developer	<p>Please refer to response no 116.</p> <p>"Carbon Dioxide Removal (Removal) is defined by VERRA as a long-term atmospheric benefit that is attributable to project activities. These activities are known to increase durably-stored carbon stocks in geological, terrestrial, ocean, or product carbon pools, net of associated project and leakage emissions. It is characterized by the anthropogenic enhancement of biological or geochemical sinks and the transfer of biogenic carbon from short-term to long-term carbon pools. The exclusion of natural CO2 uptake and the maintenance of declining carbon stocks is specified. It is represented that one metric tonne of CO2 removed from the atmosphere corresponds to one carbon dioxide removal. An elaborate procedures for calculating both Greenhouse Gas (GHG) emission reductions ("reductions") and carbon dioxide removals ("removals") from eligible project activities is provided by the VT00XX: Tool for Differentiating Reductions and Removals in CCS Projects ."</p>
Aster Global Findings - Round 1	<p>The development team took due account of the comment by clearly explaining the differences between reductions and removals as defined by VERRA, and pointing out the tool which will be used to help project developers track removals/reductions during a CCS project.</p>

Item	29
Comment Number	51
Related Document	Methodology for CCS
Entity	Sascha Bussat
Section	3 - Definitions
Page number	5
Type of Comment	Proposed Change
Comment	<p>Unfortunately, I am not lawyer, but I get the impression that the definition is very vague.</p> <ul style="list-style-type: none"> - Climeworks DAC pilot project in Switzerland might not be longer eligible, as they are a few meters away from a point source. Similar for their Icelandic projects. - What is "well-mixed". That is not physically defined. - What is "free atmosphere"? Flue gas leaves a chimney and goes directly into the free atmosphere. - What is "ambient air temperature"? It could be very high (Iceland/desert/...). - "sufficiently far enough away from point sources" Just have a look at the NASA visualization of CO2 in the atmosphere: NASA SVS Atmospheric Carbon Dioxide https://svs.gsfc.nasa.gov/5110 - Especially the last part of the sentence opens up for various interpretations. And I would argue that a capturing of CO2 from flue gas, a meter above a chimney, could still be interpreted as atmospheric CO2. <p>The absence of a technically precise definition highlights the vulnerability of that methodology. Using the energy consumption of projects would be technically easy to accomplish and therefore, should be the favorable solution.</p>
Cluster	C

Response from Methodology Developer	<p>Atmospheric CO2 defines CO2 that is present in the atmosphere and is not significantly influenced by any local point source emissions. This distinguishes it from CO2 that might be emitted directly from industrial or other processes.</p> <p>Clarifications:</p> <p>Well-mixed: This term indicates that CO2 is uniformly distributed in the atmosphere and isn't concentrated due to recent emissions from a nearby source.</p> <p>Free atmosphere: This refers to the atmosphere that isn't immediately affected by localized emissions, such as those directly from a chimney.</p> <p>Ambient air temperature: Refers to the natural temperature of the atmosphere, which can vary based on location and time.</p> <p>Sufficiently far enough away from point sources: The intent is to ensure that the captured CO2 isn't directly sourced from a localized emission but rather from the general atmosphere.</p> <p>Text has been revised based on the comment:</p> <p>Based on your feedback, the definition could be revised for clarity as follows:</p> <p>Atmospheric Carbon Dioxide (CO2): Carbon Dioxide (CO2) is a naturally occurring gas and is a by-product of burning fossil fuels and biomass, as well as land-use changes and other industrial processes. It is the principal anthropogenic greenhouse gas that affects the Earth's radiative balance.</p>
Aster Global Findings Round 1	It is unclear to the assessment team, what if any changes were made based on the first section of the development teams response. It appears that the current text does not contain "well-mixed", "Ambient air temperature", Sufficiently far enough away from point sources".
Aster Global Round 1 Findings (NCR/CL/OFI)	CL: Please clarify how the first part of the developers response is aligned with the revised text.
Round 1 Response from Methodology Developer	Changes are made due to comments received by the public. well-mixed", "Ambient air temperature", Sufficiently far enough away from point sources". are removed from the definitions.
Aster Global Round 2 Findings (NCR/CL/OFI)	Text has been updated per the commenters suggestion. Finding is closed. After the findings were closed, Verra modified the methodology. These changes were driven by Verra requirements, moving guidance to the modules, updating to the current Verra style guide and to align the methodology to the ICVCM.

Item	30
Comment Number	52
Related Document	Methodology for CCS
Entity	Sascha Bussat
Section	3 - Definitions
Page number	5
Type of Comment	Proposed Change
Comment	Does "sustainable" not include "renewable"? Where is "sustainable" defined?
Cluster	C

Response from Methodology Developer	Sustainable biomass is defined in the VT00XX: Tool for Differentiating Reductions and Removals in CCS Projects , which will be available for public consultation in other modules and tools that cover related CCS activities. Question is not relevant to this public consultation.
Aster Global Findings - Round 1	The referenced methodology/module is not yet complete, and future references cannot be assessed. The Assessment team notes that the referenced methodology/module appears to be a reasonable location to address the commentors concern.

Item	31
Comment Number	53
Related Document	Methodology for CCS
Entity	Sascha Bussat
Section	3 - Definitions
Page number	5
Type of Comment	General Feedback
Comment	Interesting to see, that BECCS is not only defined as post-combustion. That might make it difficult to develop a BECCS capture module.
Cluster	C
Response from Methodology Developer	The BECCS module for power and heat applications are in the public consultation (VMD00XX: Module for CO2 Capture From Bioenergy Combustion). BECCS module for other processes is under development (VMD00XX: Module for CO2 Capture from Bioproduction Processes). So there will be two BECCS module one is for post-combustion the other one is for bioproducts. Question is not relevant to this public consultation.
Aster Global Findings - Round 1	The development team took due account of the comment by explaining there will be two BECCS modules which are differentiated by power/heat and bioenergy combustion. The assessment team notes that these modules are not yet complete, but appear to be a reasonable location to provide more details as to the development of a BECCS project activity.

Item	32
Comment Number	54
Related Document	Methodology for CCS
Entity	Sascha Bussat
Section	3 - Definitions
Page number	5
Type of Comment	General Feedback
Comment	Biologic Sources: Plants capture CO2 from the atmosphere which contains today around 40% of CO2 from fossil sources. Therefore, the definition of "biogenic sources" is misleading. Here, the plants act as a converter to turn fossil CO2 into biological CO2. What is the purpose of it and how does the climate benefit from it?
Cluster	C

Response from Methodology Developer	<p>The term "Biogenic Sources" in the provided text refers to carbon/carbon dioxide sources originating from organic materials, particularly recently living organisms such as plants. It doesn't delve into the origin of the CO2 in the atmosphere that plants absorb.</p> <p>The primary distinction in the definition of "Biogenic Sources" is between CO2 from organic, recently living materials and CO2 from other sources, such as direct emissions from fossil fuels. The goal isn't to trace the source of the atmospheric CO2 absorbed by plants but to categorize the CO2 by its immediate source. VMD00XX: Module for CO2 Capture From Bioenergy Combustion and VMD00XX: Module for CO2 Capture from Bioproduction Processes module provide a comprehensive framework for the capture activities from biogenic sources. The modules will be available for public consultation.</p>
Aster Global Findings Round 1	<p>The development team took due account of the comment by clarifying that the definition is not intended to trace the source of the CO2, but to differentiate between fossil fuel sources and organic material sources. The assessment team notes that the referenced methodology/module is not yet complete, and future references cannot be assessed. The Assessment team also notes that the referenced methodology/module appears to be a reasonable location to address the commentors concern.</p>

Item	33
Comment Number	55
Related Document	Methodology for CCS
Entity	Sascha Bussat
Section	3 - Definitions
Page number	6
Type of Comment	Proposed Change
Comment	<p>DAC: Why is "concentrate" relevant? I would argue, that it is included in the capture. (Analogue: Fishing: takes out the fishes from the sea - no concentration necessary.) Remove "and concentrate".</p>
Cluster	C
Response from Methodology Developer	<p>The terms "capture" and "concentrate" in the context of DAC serve slightly different purposes. While "capture" denotes physically removing CO2 from the air, "concentrate" specifies increasing the proportion of CO2 in the captured stream. This distinction is essential because, in the atmosphere, CO2 is present at a much lower concentration compared to other gases. Thus, merely capturing CO2 might yield a mixture with a low CO2 fraction, which might not be suitable for storage or utilization. Therefore, the concentration process increases the fraction of CO2 in the captured stream to make it usable.</p>
Aster Global Findings Round 1	<p>The development team took due account of the comment by clarifying why concentration is an important element of a DAC system, as the captured CO2 concentration may be unsuited for use in storage or utilization.</p>

Item	34
Comment Number	56
Related Document	Methodology for CCS

Entity	Sascha Bussat
Section	2 - Summary Description of the Methodology
Page number	4
Type of Comment	General Feedback
Comment	It seems to be inconsistent to refer to GHG here and to CO2 later. Referring to CO2 alone, will exclude other greenhouse gases in the future.
Cluster	K
Response from Methodology Developer	The currently formulated methodology primarily pertains to CO2 capture and storage. Future iterations or additional methodologies could address other GHGs as deemed necessary.
Aster Global Findings Round 1	- It is unclear to the assessment team how the developers response addresses the commenters concern that the use of GHGs in the summary description of the methodology is inconsistent with the rest of the document.
Aster Global Round 1 Findings (NCR/CL/OFI)	1 CL: Please clarify in line with the finding
Round 1 Response from Methodology Developer	Summary section of the methodology is revised accordingly.
Aster Global Round 2 Findings (NCR/CL/OFI)	2 Text has been updated per the commenters suggestion. Finding is closed.

Item	35
Comment Number	57
Related Document	Methodology for CCS
Entity	Sascha Bussat
Section	3 - Definitions
Page number	6
Type of Comment	General Feedback
Comment	Geological Storage Complex: I am wondering, if the "reliable trapping" will allow for injection of CO2 dissolved in water without any caprock. Would be e.g. important for the CO2 injection in basalt.
Cluster	C
Response from Methodology Developer	The term "Confining Zones" within the GCS Non-Permanent Risk Tool, particularly article 2.2.5 relating to design risk for geological storage, delineates that each storage reservoir must encompass a minimum of two confining zones situated above the sequestration zone. Should this criterion not be met, the risk is designated as 1. This essentially implies that 1% of the granted credits will be retained in a buffer account. The core distinction here is ensuring the effective containment of the sequestered carbon. The GCS Risk Tool furnishes a structured framework for understanding these containment measures and will be integrated into subsequent modules and tools that address associated geological storage activities.
Aster Global Findings Round 1	- The development team took due account of the comment by pointing out details for reliable trapping are detailed in the GCS Non-Permanence Risk Tool.

Item	36
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Comment Number	58
Related Document	Methodology for CCS
Entity	Sascha Bussat
Section	3 - Definitions
Page number	6
Type of Comment	General Feedback
Comment	Mode of Transport: Completely unclear what it is about.
Cluster	C
Response from Methodology Developer	The "Mode of Transport" pertains to the various methods employed to convey CO2 from its origin (for instance, where it is captured) to its designated endpoint, a storage location or a transfer point to another transportation method. Common transportation methods for CO2 encompass pipelines, ships, rail, and trucks.
Aster Global Findings - Round 1	The development team took due account of the comment by clearly explaining various modes of CO2 transport (truck, rail etc.) are allowed under the methodology. After the findings were closed, Verra modified the methodology. These changes were driven by Verra requirements, moving guidance to the modules, updating to the current Verra style guide and to align the methodology to the ICVCM.

Item	37
Comment Number	59
Related Document	Methodology for CCS
Entity	Sascha Bussat
Section	3 - Definitions
Page number	7
Type of Comment	Proposed Change
Comment	Point source Limitation to stationary source should be removed. Reasoning: First projects start CO2 capturing on vessels.
Cluster	C
Response from Methodology Developer	The current framework does not encompass the capture of CO2 on vessels. However, the modular approach of the CCS framework provides flexibility to integrate new project activities by adding supplementary modules by methodology proponents.
Aster Global Findings - Round 1	The development team took due account of the comment by confirming CO2 capture on vessels is not currently permitted under the methodology. After the findings were closed, Verra modified the methodology. These changes were driven by Verra requirements, moving guidance to the modules, updating to the current Verra style guide and to align the methodology to the ICVCM.

Item	38
Comment Number	60
Related Document	Methodology for CCS
Entity	Sascha Bussat
Section	3 - Definitions

Page number	7
Type of Comment	Proposed Change
Comment	Post-combustion Capture Here it is referred to "exhaust gas" while "flue gas" was defined before, coming from a combustion process. The wording should be aligned to avoid confusions.
Cluster	C
Response from Methodology Developer	Exhaust gas is removed and Methodology uses flue gas only to avoid confusion.
Aster Global Findings - Round 1	The development team updated the methodology by removing references to exhaust gas as suggested by the commenter.

Item	39
Comment Number	61
Related Document	Methodology for CCS
Entity	Sascha Bussat
Section	3 - Definitions
Page number	7
Type of Comment	Proposed Change
Comment	Pre-combustion Capture: Absorption of CO2 from fuels (e.g. Sleipner) should be included as well.
Cluster	C
Response from Methodology Developer	Text has been revised based on the comment: "Pre-combustion Capture: Pre-combustion capture refers to removing or absorbing carbon dioxide from fuels before combustion."
Aster Global Findings - Round 1	The development team updated the methodology by adding "absorbing" to the definition of pre-combustion capture as suggested by the commenter.

Item	40
Comment Number	62
Related Document	Methodology for CCS
Entity	Sascha Bussat
Section	3 - Definitions
Page number	7
Type of Comment	Proposed Change
Comment	Saline Acquifer: 3g/L (reference: seawater contains 35g/L)
Cluster	C
Response from Methodology Developer	Please refer to response no 235. "Text has been revised based on the comment: •The definition has been deleted in the Methodology •The definition stays in the Aquifer Storage Module •The applicability conditions for the Aquifer Storage Module reflect this definition."
Aster Global Findings - Round 1	It is unclear to the assessment team how removing the definition from the methodology takes due account of the suggest definition update.
Aster Global Round 1 Findings (NCR/CL/OFI)	CL: Please clarify in line with the finding and the original comment.

Round 1 Response from Methodology Developer	An underground water source characterized by a total dissolved solids content greater than 3000 mg/L, often classified as brackish water, which has higher salinity than freshwater but less than seawater. With the 3000 mg/L, it is safeguarded that fresh water is not used for stroge.
Aster Global Round Findings (NCR/CL/OFI)	2 Finding is closed. The Assessment team also notes that the referenced methodology/module appears to be a reasonable location to address the commentors concern

Item	41
Comment Number	63
Related Document	Methodology for CCS
Entity	Sascha Bussat
Section	3 - Definitions
Page number	7
Type of Comment	Proposed Change
Comment	Source facility: ... where CO2 is originated and from where ... Reasoning: CO2 might be not only generated (e.g. chemical process), it can also be a part of the produced hydrocarbon.
Cluster	C
Response from Methodology Developer	Text has been revised based on the comment: "Source Facility: Any building, structure, facility, or installation capable of emitting or potentially emitting pollutants, located on adjacent or contiguous properties within the same industrial category, and managed by the same entity or individuals under common control."
Aster Global Findings - Round 1	It is unclear to the assessment team how the updated language addresses the commenters concern that CO2 can also be part of the produced hydrocarbon.
Aster Global Round Findings (NCR/CL/OFI)	1 CL: Please clarify in line with the finding and the original comment.
Round 1 Response from Methodology Developer	Definition is revised not to limit generated CO2. New definition reflects also concerns of the commentor.
Aster Global Round Findings (NCR/CL/OFI)	2 Text has been updated. Finding is closed. After the findings were closed, Verra modified the methodology. These changes were driven by Verra requirements, moving guidance to the modules, updating to the current Verra style guide and to align the methodology to the ICVCM.

Item	42
Comment Number	64
Related Document	Methodology for CCS
Entity	Sascha Bussat
Section	4 - Applicability Conditions
Page number	8
Type of Comment	Proposed Change
Comment	... that capture CO2 at a source facility ... Reasoning: Simplify as it contains no additional information. Specifying atmospheric or point source CO2 does not exclude any activity.
Cluster	D

Response from Methodology Developer	The methodology distinguishes between "atmospheric CO2" and "CO2 from point sources." This distinction is vital because there are specific capture activities, like Direct Air Capture (DAC) listed under eligible CO2 capture activities, which primarily focus on capturing atmospheric CO2. Therefore, it is essential to retain this differentiation to ensure that the methodology accurately represents the different sources of CO2 that can be captured.
Aster Global Findings - Round 1	The methodology developer took due account of the comment by noting that distinguishing between atmospheric CO2 and CO2 from point sources is an important distinction for particular capture modules

Item	43
Comment Number	65
Related Document	Methodology for CCS
Entity	Sascha Bussat
Section	3 - Definitions
Page number	7
Type of Comment	Proposed Change
Comment	The applicability conditions require permanent storages, whereas permanence is not defined. Include a permanence definition for geological storages.
Cluster	C
Response from Methodology Developer	Requirements of permanence are defined in the VCS GCS Requirements and Non-permanence risk tool. Question is not relevant to this public consultation.
Aster Global Findings - Round 1	The development team took due account of the comment by referencing the VCS GCS requirements and non-permanence risk tool.

Item	44
Comment Number	66
Related Document	Methodology for CCS
Entity	Sascha Bussat
Section	4 - Applicability Conditions
Page number	8
Type of Comment	General Feedback
Comment	4.2: This looks like a mess. An artificial sorting. There is no sorting by capturing method nor by CO2 source. Why are 2 first marked modules separated? Both use fossil fuels and use most like the same capturing process. The BECCS module contains different capturing techniques, although the CO2 source might be the same. It does not support simplification nor transparency. Suggestion: Sort activities by their capturing techniques.
Cluster	D

Response from Methodology Developer	<p>Please refer to response no 47.</p> <p>"The modules' organization is based on the source of emissions and the technology used for capture. Each module explains the scope and applicability of the module however to clarify:</p> <p>Industrial processes vs. Oil/Gas processing: While both are industrial, "industrial processes" refers to emissions from various industrial activities such as cement or steel production. In contrast, "oil/gas processing" targets explicitly oil and gas processing emissions.</p> <p>BECCS have two modules one is for post-combustion the other one is for bioproducts. Given its unique blend of technology and potential for negative emissions, we believe it deserves a dedicated module.</p> <p>Organization by capturing technology: Your suggestion about organizing by capturing technology, like post-combustion or pre-combustion, is valid. Our current approach is designed to align with industry practices and the source of emissions. However, we appreciate your feedback."</p>
Aster Global Findings Round 1	The Methodology developer clearly responds to the suggestion to re-organize the arrangement of the modules by capture technology, by explaining the relevancy for sources of emissions to be considered, and notes that more details on applicability conditions are specified in each module.

Item	45
Comment Number	67
Related Document	Methodology for CCS
Entity	Sascha Bussat
Section	4 - Applicability Conditions
Page number	9
Type of Comment	Proposed Change
Comment	<p>4.5: Why 95%?</p> <p>Suggestion: Remove it, as it contains an unnecessary limitation for potential future projects. (What about dissolving CO2 in water to inject it? The 95% purity cannot be achieved.)</p>
Cluster	D
Response from Methodology Developer	<p>Text has been revised based on the comment:</p> <p>"6. Capture activities must ensure that the CO2 stream delivered to the storage site meets the following requirements:</p> <ul style="list-style-type: none"> oA minimum concentration of 95% purity and o complies with the applicable regulations of the national/regional/local project jurisdiction related to CO2 purity and the concentration of co-injected substances. <p>"</p>
Aster Global Findings Round 1	It is unclear how adding the second bullet relating to regulations addresses the concern about dissolving CO2 into water for injection.
Aster Global Round 1 Findings (NCR/CL/OFI)	CL: Please clarify how the added bullet addresses the concern about dissolving CO2 into water before injection.
Round 1 Response from Methodology Developer	CO2 dissolved in water is not applicable as per the methodology therefore it is not added to the definition.
Aster Global Round 2 Findings (NCR/CL/OFI)	Dissolving CO2 in water is not applicable, so no changes were made. Finding is closed.

Item	46
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Comment Number	68
Related Document	Methodology for CCS
Entity	Sascha Bussat
Section	4 - Applicability Conditions
Page number	9
Type of Comment	Proposed Change
Comment	"Extract CO2 from a geologic formation for the ONLY purpose of capturing it" Reasoning: Native CO2 from hydrocarbon production should be allowed to capture, when the revenues from the CO2 capturing are minor compared to the hydrocarbon activity.
Cluster	D
Response from Methodology Developer	Text has been revised based on the comment: • Extract CO2 from a geologic formation to generate credits,
Aster Global Findings Round 1	- The commentor is proposing allowing Native CO2 capture from hydrocarbon production sites. It is unclear how the revised comment addresses this concern.
Aster Global Round 1 Findings (NCR/CL/OFI)	1 CL: Please clarify how the revised text addresses the proposed capture activity raised by the commentor.
Round 1 Response from Methodology Developer	Commentors recommended activity is not eligible by the methodology.
Aster Global Round 2 Findings (NCR/CL/OFI)	2 Proposed change is not eligible, so no changes were made per the commenters suggestion. Finding is closed.

Item	47
Comment Number	69
Related Document	Methodology for CCS
Entity	Sascha Bussat
Section	5 - Project Boundary
Page number	11
Type of Comment	Proposed Change
Comment	Figure 1: Where is the difference between non-VCS CO2 entering at the end of a module or at the beginning? Should the arrows not simply connect to the CO2 stream in between the modules?
Cluster	E
Response from Methodology Developer	Figure 1 illustrates the possible entry points for the non-VCS streams, whether after the capture point or transport or before the storage site. Details on the non-VCS streams are detailed in the VT00XX: Tool for Accounting non-VCS CO2 in CCS Projects.
Aster Global Findings Round 1	- The development team took due account of the comment by stating that Figure 1 illustrates all possible entry points for the non-VCS CO2 streams.

Item	48
Comment Number	70
Related Document	Methodology for CCS
Entity	Sascha Bussat

Section	5 - Project Boundary
Page number	11
Type of Comment	Proposed Change
Comment	Why is there an outtake of CO2 towards non-VCS utilization/storage? That will have no impact on generated credits and could be removed for simplification.
Cluster	E
Response from Methodology Developer	Please refer to response no 71. "Including non-VCS CO2 streams, especially those utilizing shared CCS hubs where CO2 streams originate from various projects, is a strategic approach that enhances the practicality and scalability of CCS+ framework. Recognizing the potential risks, such as a ton of non-VCS CO2 potentially producing 0.9 ton of CO2 emissions, methodology employs rigorous procedures for monitoring, quantifying, and controlling the entry and influence of non-VCS CO2 streams on project outcomes. The "Tool for Accounting non-VCS CO2 in CCS Projects" establishes detailed criteria and procedures for the quantification and allocation of project emissions (PEnon-VCS CO2y) and leakage emissions (LEnon-VCS CO2y) for projects where non-VCS CO2 flows through the project boundary. "
Aster Global Findings Round 1	The developers response acknowledges the potential complexity of CO2 streams, and chose to keep all references to non-vcs CO2 streams detailed in the figure to ensure future projects have clear guidance. The referenced module is not yet completed, but appears to be a reasonable location to detail the procedures used to account for all CO2 streams (VCS and non-VCS).

Item	49
Comment Number	71
Related Document	Methodology for CCS
Entity	Sascha Bussat
Section	5 - Project Boundary
Page number	11
Type of Comment	General Feedback
Comment	Allowing non-VCS CO2 to enter the boundaries involves a high risk for the methodology, when the origin of the CO2 is unclear. A ton of non-VCS CO2 could have produced 0,9 ton of CO2 emissions. How can that be handled and controlled? There is a high risk of undermining the quality of that methodology.
Cluster	E

Response from Methodology Developer	Including non-VCS CO2 streams, especially those utilizing shared CCS hubs where CO2 streams originate from various projects, is a strategic approach that enhances the practicality and scalability of CCS+ framework. Recognizing the potential risks, such as a ton of non-VCS CO2 potentially producing 0.9 ton of CO2 emissions, methodology employs rigorous procedures for monitoring, quantifying, and controlling the entry and influence of non-VCS CO2 streams on project outcomes. The "Tool for Accounting non-VCS CO2 in CCS Projects" establishes detailed criteria and procedures for the quantification and allocation of project emissions (PEnon-VCS CO2y) and leakage emissions (LEnon-VCS CO2y) for projects where non-VCS CO2 flows through the project boundary.
Aster Global Findings Round 1	The developers response acknowledges the potential complexity of CO2 streams, and chose to keep all references to non-vcs CO2 streams detailed in the figure to ensure future projects have clear guidance. The referenced module is not yet completed, but appears to be a reasonable location to detail the procedures used to account for all CO2 streams (VCS and non-VCS).

Item	50
Comment Number	72
Related Document	Methodology for CCS
Entity	Sascha Bussat
Section	5 - Project Boundary
Page number	12
Type of Comment	Proposed Change
Comment	Materiality threshold: The 2% threshold seems to be to high: - for a typical 1 Mtpa project, 2% means 20.000 tCO2 - This accounts for every source independently, in sum, several sources together can have a significant impact. Suggestion: The sum of all sources should not exceed 2%.
Cluster	E

Response from Methodology Developer	<p>Please refer to response 26.</p> <p>"VCS Methodology Requirements v 4.4, particularly paragraph 3.7.3, permits the exclusion of leakage sources deemed de minimis, i.e., insignificant to the overall GHG emission profile of a project. VCS Methodology Requirements also refers to the CDM A/R methodological tool, "Tool for testing significance of GHG emissions in A/R CDM project activities," to determine the significance of the leakage emission source. According to this tool, GHG emission sources may be considered negligible if they account for less than 5% of the total decreases in carbon pools and increases in emissions or less than 5% of net anthropogenic removals by sinks, opting for the lower threshold. In the development of the CCS Methodology, a detailed analysis was undertaken to ensure that emissions from fabrication, construction, disposal, and decommissioning fell below this significance threshold. To adopt a conservative approach and ensure that the methodology remains focused on the most substantial emissions, the de minimis threshold was adjusted from the suggested 5% to a more stringent 2%. This decision was made to prioritize accuracy in GHG accounting while maintaining practicality and feasibility in project implementation and monitoring."</p>
Aster Global Findings Round 1	<p>It is unclear to the assessment team if the analysis done showed that emissions from fabrication, construction, disposal and decommissioning combined resulted in emissions less than the 2% threshold, or if each one individually was less than 2%.</p>
Aster Global Round 1 Findings (NCR/CL/OFI)	<p>CL: Please clarify in line with the finding.</p>
Round 1 Response from Methodology Developer	<p>The 2% materiality threshold is applied to determine which leakage emissions should be included in the GHG quantification. A leakage source is included in the quantification if it is estimated to be over 2% of the net project emission reductions and Carbon Dioxide removals over the anticipated typical project lifetime. At the same time it was ensured that the total excluded leakage emissions do not exceed the 2% threshold. This threshold helps in identifying significant leakage sources while allowing for the exclusion of minor ones to simplify the calculation process. The document also lists specific leakage sources that are typically excluded, such as the production and transport of equipment and materials for construction, and staff commuting. To address your point about optional leakage sources, the methodology provides which emissions sources are considered material and should be included. This is determined based on the justification provided in the methodology for the materiality threshold, and it is not the responsibility of the project proponent to conduct materiality checks for each project activity.</p>
Aster Global Round 2 Findings (NCR/CL/OFI)	<p>Text has been updated to be more clear and in line with the commenters suggestion. Finding is closed.</p>

Item	51
Comment Number	73
Related Document	Methodology for CCS
Entity	Sascha Bussat
Section	5 - Project Boundary
Page number	12
Type of Comment	Proposed Change

Comment	It should be explicit mentioned, that embodied emissions (emissions related to facility production/construction/deconstructions) need to be considered.
Cluster	E
Response from Methodology Developer	<p>Please refer to response 26.</p> <p>"VCS Methodology Requirements v 4.4, particularly paragraph 3.7.3, permits the exclusion of leakage sources deemed de minimis, i.e., insignificant to the overall GHG emission profile of a project. VCS Methodology Requirements also refers to the CDM A/R methodological tool, "Tool for testing significance of GHG emissions in A/R CDM project activities," to determine the significance of the leakage emission source. According to this tool, GHG emission sources may be considered negligible if they account for less than 5% of the total decreases in carbon pools and increases in emissions or less than 5% of net anthropogenic removals by sinks, opting for the lower threshold. In the development of the CCS Methodology, a detailed analysis was undertaken to ensure that emissions from fabrication, construction, disposal, and decommissioning fell below this significance threshold. To adopt a conservative approach and ensure that the methodology remains focused on the most substantial emissions, the de minimis threshold was adjusted from the suggested 5% to a more stringent 2%. This decision was made to prioritize accuracy in GHG accounting while maintaining practicality and feasibility in project implementation and monitoring."</p>
Aster Global Findings Round 1	The developers took due account of the comment and detailed the steps taken to ensure conservativeness by lowering the CDM recommended deminimis threshold from 5% to 2%. The developers also detailed the analysis which excluded the emissions associated with construction/fabrication.

Item	52
Comment Number	74
Related Document	Methodology for CCS
Entity	Sascha Bussat
Section	7 - Additionality
Page number	15
Type of Comment	Proposed Change
Comment	<p>Point 6</p> <p>Although difficult to acces, but financial benefits from marketing should be considered as well.</p> <p>Companies could gain competible advantages from marketing their company as "green".</p>
Cluster	F
Response from Methodology Developer	While we acknowledge that marketing one's company as "green" might offer competitive advantages, quantifying such benefits in monetary terms can be highly subjective and challenging. Given the rigor and precision we aim for, the methodology primarily focuses on direct financial metrics rather than potential marketing gains.
Aster Global Findings Round 1	The response is sufficient. No further action is required

Item	53
Comment Number	75
Related Document	Methodology for CCS
Entity	Sascha Bussat
Section	7 - Additionality
Page number	16
Type of Comment	General Feedback
Comment	"An investment return value of 21% is accepted under this methodology" Does it mean that an investment return of 30% is not accepted? What does it mean? A project cannot sell its credits at a higher price, although the market would pay it? Is here an unnecessary limitation?
Cluster	F
Response from Methodology Developer	The methodology does not impose restrictions on the sale price of carbon credits. Projects can sell their credits at market rates, even exceeding the return threshold. The 21% benchmark is used for assessing a project's additionality without carbon revenues in order to determine, if the project would have been financially attractive without carbon revenues.
Aster Global Findings Round 1	The methodology developer clarified that the 21% benchmarking is used for assessing additionality, and noted that the methodology does not impose restrictions on the sale price of carbon credits.

Item	54
Comment Number	76
Related Document	Methodology for CCS
Entity	Sascha Bussat
Section	8.1 - Baseline Emissions
Page number	17
Type of Comment	General Feedback
Comment	Reduction/removal is not technically defined. Post-combustion capture from fossil fuel can be designed to represent removal. That is still a big challenge and should be clarified, before implementing vague definitions into new methodologies. And, the differentiation seems not to be beneficial for the climate, when it results in reduced focus on carbon emission reduction. It would be great if Verra further increases its focus on climate impact.
Cluster	G

Response from Methodology Developer	<p>Please refer to response no 116.</p> <p>"Carbon Dioxide Removal (Removal) is defined by VERRA as a long-term atmospheric benefit that is attributable to project activities. These activities are known to increase durably-stored carbon stocks in geological, terrestrial, ocean, or product carbon pools, net of associated project and leakage emissions. It is characterized by the anthropogenic enhancement of biological or geochemical sinks and the transfer of biogenic carbon from short-term to long-term carbon pools. The exclusion of natural CO2 uptake and the maintenance of declining carbon stocks is specified. It is represented that one metric tonne of CO2 removed from the atmosphere corresponds to one carbon dioxide removal. An elaborate procedures for calculating both Greenhouse Gas (GHG) emission reductions ("reductions") and carbon dioxide removals ("removals") from eligible project activities is provided by the VT00XX: Tool for Differentiating Reductions and Removals in CCS Projects ."</p>
Aster Global Findings Round 1	<p>The assessment team can find no reference to post-combustion capture from fossil fuel representing a removal.</p> <p>The development team referred to a tool that would likely contain clarifications in reductions vs removals which would address the commentors confusion; however, assessments on tools that have not yet been completed is not possible. The last line is a comment to vererra.</p>

Item	55
Comment Number	77
Related Document	Methodology for CCS
Entity	Sascha Bussat
Section	8.1 - Baseline Emissions
Page number	18
Type of Comment	General Feedback
Comment	Why is the baseline emission equal to an injected mass? What is with project emissions?
Cluster	G
Response from Methodology Developer	<p>The methodology defines the baseline scenario in a manner that reflects the absence of the project activity. For CO2 captured from the atmosphere or point sources, it's assumed that in the absence of the project, these emissions would have been released into the atmosphere or would not be captured.</p> <p>By monitoring the mass of injected CO2 as a proxy for baseline emissions and then deducting project and leakage emissions, the methodology provides a straightforward and effective means of calculating net GHG mitigation outcomes. This reflects a pragmatic approach to accounting, where the focus is on the net difference made by the project, thereby simplifying the monitoring and verification process.</p>
Aster Global Findings Round 1	<p>The methodology development teams response took due account of the comment by explaining the baseline scenario and providing details of how project emissions will subtracted out resulting in net GHG reduction/removal.</p>

Item	56
Comment Number	78
Related Document	Methodology for CCS
Entity	Sascha Bussat
Section	8.1.1 - Methods for CO2 Measurement
Page number	18
Type of Comment	Proposed Change
Comment	Please allow for alternative measurements, as long as they can be documented to be sufficiently precise. (To my understanding, at Sleipner the injected CO2 is not directly measured, but estimated via a mass balance of the incoming and outgoing gas stream.)
Cluster	G
Response from Methodology Developer	Please refer to response no 15. "The methodology details the approaches for measuring CO2 via mass flow or volumetric flow rate. So only mass and volumetric approach is applicable as defined in the section 8.1 of the methodology. "
Aster Global Findings - Round 1	It is unclear to the assessment team how the developers response addresses the commentors suggestion to include alternative measurements as long as they can be sufficiently precise.
Aster Global Round 1 Findings (NCR/CL/OFI)	CL: Please clarify in line with the finding.
Round 1 Response from Methodology Developer	Methodology development team chooses to keep current procedures for CO2 measurement as it is recommended by the CCS+ members.
Aster Global Round 2 Findings (NCR/CL/OFI)	Finding is closed.

Item	57
Comment Number	79
Related Document	Methodology for CCS
Entity	Sascha Bussat
Section	2 - Summary Description of the Methodology
Page number	4
Type of Comment	Proposed Change
Comment	The methodology should allow for capture and storage module only - skipping the transport module in case of onsite injection without transport or intermediate storages.
Cluster	D

Response from Methodology Developer	<p>Please refer to response no 20</p> <p>"The current framework ensures the safe and efficient transport of captured CO2 to eligible storage sites, particularly when these sites are not co-located or directly adjacent to the capture facilities. As detailed in the applicability conditions, project activities must encompass both an eligible capture and storage activity. However, if the storage site is co-located or directly adjacent to the capture site, there is no requirement for a separate transport activity.</p> <p>Text has been revised based on the comment: "Project activities must include at least one eligible capture activity and at least one eligible storage activity. If the project activity is not co-located or not adjoining the capture site, it must use an eligible transport activity. However, in situations where the storage sites are co-located or are adjoining the capture sites, the capture module boundary is directly attached to the storage module boundary, and thus, the project proponent could cover all equipment under one project boundary without defining a separate module boundary for transport.""</p>
Aster Global Findings Round 1	<p>The methodology developer has revised the language to make it clear that a transport activity is not required if the capture and storage sites are co-located or are adjoining.</p> <p>After the findings were closed, Verra modified the methodology. These changes were driven by Verra requirements, moving guidance to the modules, updating to the current Verra style guide and to align the methodology to the ICVCM.</p>

Item	58
Comment Number	88
Related Document	Methodology for CCS
Entity	Sumitomo Corporation
Section	4 - Applicability Conditions
Page number	8, 9, 10
Type of Comment	General Feedback

Comment	<p>In this section, it is written that eligible CO2 activities include flue gas capture from industrial processes including the mineral production as below. "Flue gas capture from industrial processes including the chemical industry, mineral production, steel production, cement plants, and hydrogen (H2) production, as defined in VMD00XX: CO2 Capture from Industrial Processes;"</p> <p>It is also written that CO2 captured only by DAC or BECCS are applicable to generate removals as below. "Under this methodology, only CO2 streams captured using the following activities are applicable to generate removals: • Activities that comply with VMD00XX: CO2 Capture from Air (Direct Air Capture); or Methodology: VCS Version 4.010 • Activities that comply with the criteria provided by VMD00XX: CO2 Capture from Biogenic Sources (BECCS)."</p> <p>However, we believe, CO2 captured by the below process are also applicable to BECCS if such CO2 are originated from biomass. For example, in some mineral smelting plants, they are trying to develop the way to use "biocoaks", which is made from biomass such as wood chip and forest residue, as reducing agent in order to replace traditional coaks made from coal. In this case, CO2 captured and stored properly in this plant are, we believe, regarded as CO2 removed same as BECCS. Thus, the above process should be also considered as BECCS.</p>
Cluster	D
Response from Methodology Developer	The current framework does not encompass the biocoaks. However, the modular approach of the CCS framework provides flexibility to integrate new project activities by adding supplementary modules.
Aster Global Findings - Round 1	The methodology developer answered the commentors question by stating that Biocoaks are not an eligible project activity in the current CCS methodology framework and is therefore not relevant.

Item	59
Comment Number	89
Related Document	Methodology for CCS
Entity	Global CCS Institue
Section	3 - Definitions
Page number	5
Type of Comment	Proposed Change
Comment	Atmospheric Carbon Dioxide (CO2) - contradictory?? not impacted by point sources but may vary due to anthropogenic sources...which are point sources??
Cluster	C

Response from Methodology Developer	<p>Please refer to response 51.</p> <p>"Atmospheric CO2 defines CO2 that is present in the atmosphere and is not significantly influenced by any local point source emissions. This distinguishes it from CO2 that might be emitted directly from industrial or other processes.</p> <p>Clarifications:</p> <p>Well-mixed: This term indicates that CO2 is uniformly distributed in the atmosphere and isn't concentrated due to recent emissions from a nearby source.</p> <p>Free atmosphere: This refers to the atmosphere that isn't immediately affected by localized emissions, such as those directly from a chimney.</p> <p>Ambient air temperature: Refers to the natural temperature of the atmosphere, which can vary based on location and time.</p> <p>Sufficiently far enough away from point sources: The intent is to ensure that the captured CO2 isn't directly sourced from a localized emission but rather from the general atmosphere.</p> <p>Text has been revised based on the comment:</p> <p>Based on your feedback, the definition could be revised for clarity as follows:</p> <p>Atmospheric Carbon Dioxide (CO2): Carbon Dioxide (CO2) is a naturally occurring gas and is a by-product of burning fossil fuels and biomass, as well as land-use changes and other industrial processes. It is the principal anthropogenic greenhouse gas that affects the Earth's radiative balance."</p>
Aster Global Findings Round 1	<p>The development team took due account of the comment by updating the definition of Atmospheric Carbon Dioxide and removing the confusing language referenced by the commenter.</p> <p>After the findings were closed, Verra modified the methodology. These changes were driven by Verra requirements, moving guidance to the modules, updating to the current Verra style guide and to align the methodology to the ICVCM.</p>

Item	60
Comment Number	90
Related Document	Methodology for CCS
Entity	Global CCS Institue
Section	3 - Definitions
Page number	5
Type of Comment	General Feedback
Comment	Bioenergy Carbon Capture and Storage (BECCS) - Will WtE plants be required to demonstrate biomass in their municipal waste-streams is "renewable and sustainable"? How will that be done?
Cluster	C
Response from Methodology Developer	Requirements for WtE plants are identified in the VMD00XX: Module for CO2 Capture From Bioenergy Combustion. Question is not relevant to this public consultation.
Aster Global Findings Round 1	The referenced module is not yet complete, and future references cannot be assessed. The Assessment team notes that the referenced module appears to be a reasonable location to address the commentors concern.

Item	61
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Comment Number	91
Related Document	Methodology for CCS
Entity	Global CCS Institue
Section	3 - Definitions
Page number	5
Type of Comment	Proposed Change
Comment	Capture Facility - Unnecessarily long and complex. A facility where CO2 is captured from a gas stream and conditioned.
Cluster	C
Response from Methodology Developer	The provided definition of "Capture Facility" comprehensively details the various processes involved in capturing and conditioning CO2. It clearly outlines the components of a capture facility, emphasizing the CO2 separation and capture process and the CO2 conditioning process. The definition also clarifies the distinctiveness of independent capture units and their potential shared auxiliary equipment.
Aster Global Findings - Round 1	It is unclear to the assessment team what if any changes have been made to the capture facility definition. The current definition does not mention CO2 separation, CO2 conditioning process, or potentially shared auxiliary equipment, as suggested by the development teams response.
Aster Global Round 1 Findings (NCR/CL/OFI)	CL: Please clarify in line with the finding.
Round 1 Response from Methodology Developer	To clarify Capture facility definition is revised to "The capture facility is engineered to capture CO2 through various processes such as absorption, adsorption, membrane, electro-chemical, or cryogenic methods from diverse sources. It encompasses the capturing process occurring between the CO2 source and the transportation activity, as illustrated in capture modules"
Aster Global Round 2 Findings (NCR/CL/OFI)	Capture facility definition has been updated, but did not make all changes suggested by the commenter to ensure clarity for project developers. Finding is closed. After the findings were closed, Verra modified the methodology. These changes were driven by Verra requirements, moving guidance to the modules, updating to the current Verra style guide and to align the methodology to the ICVCM.

Item	62
Comment Number	92
Related Document	Methodology for CCS
Entity	Global CCS Institue
Section	4 - Applicability Conditions
Page number	8
Type of Comment	Proposed Change
Comment	1) Why is local storage disallowed??? Local storage is the optimum situation!
Cluster	D

Response from Methodology Developer	<p>Please refer to response no 20</p> <p>"The current framework ensures the safe and efficient transport of captured CO2 to eligible storage sites, particularly when these sites are not co-located or directly adjacent to the capture facilities. As detailed in the applicability conditions, project activities must encompass both an eligible capture and storage activity. However, if the storage site is co-located or directly adjacent to the capture site, there is no requirement for a separate transport activity.</p> <p>Text has been revised based on the comment: "Project activities must include at least one eligible capture activity and at least one eligible storage activity. If the project activity is not co-located or not adjoining the capture site, it must use an eligible transport activity. However, in situations where the storage sites are co-located or are adjoining the capture sites, the capture module boundary is directly attached to the storage module boundary, and thus, the project proponent could cover all equipment under one project boundary without defining a separate module boundary for transport."</p>
Aster Global Findings Round 1	<p>The methodology developer has revised the language to make it clear that a transport activity is not required if the capture and storage sites are co-located or are adjoining.</p> <p>After the findings were closed, Verra modified the methodology. These changes were driven by Verra requirements, moving guidance to the modules, updating to the current Verra style guide and to align the methodology to the ICVCM.</p>

Item	63
Comment Number	93
Related Document	Methodology for CCS
Entity	Global CCS Institue
Section	7 - Additionality
Page number	17
Type of Comment	General Feedback
Comment	1) point 1 - so a country with 4 or less facilities of a certain type (eg steel blast furnaces) can not have CCS on any of those facilities meet the additionality test?
Cluster	F
Response from Methodology Developer	<p>In your specific scenario, where a country has four or fewer facilities (e.g., steel blast furnaces), a single facility implementing the project activity would represent 25% or more. However, it's worth noting that similar project activities under validation, submitted for registration, or already registered under any GHG crediting program can be excluded from the common practice analysis. This means that even if a CCS project is being implemented in one of the four facilities, it may still meet the additionality test, depending on if the projects are carbon crediting or non-carbon crediting projects.</p>
Aster Global Findings Round 1	<p>The response is adequate. In addition the methodology developer updated the additionality section, clarifying the options and streamlining the process. No further action is needed</p>

Item	64
Comment Number	94
Related Document	Methodology for CCS
Entity	Global CCS Institue
Section	7 - Additionality
Page number	17
Type of Comment	General Feedback
Comment	1) point 2 - ?? confusing?
Cluster	F
Response from Methodology Developer	While the first point in the "Common Practice" section (Step 3) sets a clear percentage threshold for defining common practice, the second point provides a nuanced approach. It states that even if similar activities (like the project in question) exist, it doesn't necessarily mean the project is "common practice." The project proponent must show that they face specific barriers distinct from those faced by existing projects. This could be regarding technological challenges, higher costs, regulatory hurdles, or any other factor that sets the project apart.
Aster Global Findings Round 1	- The methodology developer updated the additionality section, clarifying the options and streamlining the process. No further action is needed

Item	65
Comment Number	95
Related Document	Methodology for CCS
Entity	Global CCS Institue
Section	7 - Additionality
Page number	17
Type of Comment	General Feedback
Comment	1) point 5 - ?? what if one prohject uses multiple source facilities in the same sector?
Cluster	F
Response from Methodology Developer	When a project uses multiple source facilities, each represents a different sector and requires a common practice assessment. This means that if a single project leverages multiple source facilities, and they belong to different sectors (e.g., one from bioethanol production and another from fossil fuel-based power generation, each source facility will have to undergo its own common practice assessment. If one or more of the sources facilities in different sectors would not meet the common practice test, it is considered non-additional and would need to be removed from the project activity for the project activity to pass additionality testing.
Aster Global Findings Round 1	- The methodology developer updated the additionality section, clarifying the options and streamlining the process. No further action is needed

Item	66
Comment Number	96
Related Document	Methodology for CCS
Entity	Global CCS Institue
Section	8.1 - Baseline Emissions
Page number	18

Type of Comment	General Feedback
Comment	BEy - I find this language confusing - baseline emissions are usually the emissions before any mitigation activity. This defines baseline emissions as the mass of CO2 captured and injected??
Cluster	G
Response from Methodology Developer	<p>Please refer to response no 77.</p> <p>"The methodology defines the baseline scenario in a manner that reflects the absence of the project activity. For CO2 captured from the atmosphere or point sources, it's assumed that in the absence of the project, these emissions would have been released into the atmosphere or would not be captured.</p> <p>By monitoring the mass of injected CO2 as a proxy for baseline emissions and then deducting project and leakage emissions, the methodology provides a straightforward and effective means of calculating net GHG mitigation outcomes. This reflects a pragmatic approach to accounting, where the focus is on the net difference made by the project, thereby simplifying the monitoring and verification process."</p>
Aster Global Findings Round 1	The methodology development teams response took due account of the comment by explaining the baseline scenario and providing details of how project emissions will subtracted out resulting in net GHG reduction/removal.

Item	67
Comment Number	97
Related Document	Methodology for CCS
Entity	Global CCS Institue
Section	8.1.1 - Methods for CO2 Measurement
Page number	18
Type of Comment	General Feedback
Comment	Methods for CO2 Measurement, para 2 - Need to check with current project operators that this requirement is practical
Cluster	G

Response from Methodology Developer	<p>During the methodology development phase, no objection was received from the operators. Also para 2 is required for accurate accounting of emissions. Please refer to response no 16.</p> <p>"The methodology set forth is based on practical considerations. Neglecting less than 0.5% impurities simplifies the calculations while reasonably accurately representing actual conditions. In the "Methods for CO2 measurement" subsection, the text provides guidelines for measuring CO2, considering the potential inaccuracies due to impurities, especially for supercritical phase CO2. Moreover, the fraction values used (0.5% and 0.25%) are industry standards and are often deemed acceptable for such calculations.</p> <p>However, your argument regarding the cumulative effect of multiple impurities, each below the 0.5% threshold, is valid. This could lead to overestimating CO2 quantities, especially in scenarios with multiple impurities close to the threshold. We propose introducing a threshold. This can be done by ensuring that the total cumulative fraction of impurities neglected should not exceed a certain threshold, (2%.)</p> <p>Text has been revised based on the comment: "In Equation (3), while individual impurities with a mole fraction of less than 0.5% can be neglected, the cumulative mole fraction of all neglected impurities should not exceed a predefined threshold (2%)."</p>
Aster Global Findings - Round 1	The methodology development team took due account of the comment by noting that no objections were made by operators and explaining the rational for balancing practical considerations against the overall accuracy of the calculation methods with respect to the impurity limits.

Item	68
Comment Number	104
Related Document	Methodology for CCS
Entity	Japan Organization for Metals and National Cooperation
Section	
Page number	
Type of Comment	
Comment	
Cluster	K
Response from Methodology Developer	NA
Aster Global Findings - Round 1	No comment to respond to.

Item	69
Comment Number	105
Related Document	Methodology for CCS
Entity	Japan Organization for Metals and National Cooperation
Section	4 - Applicability Conditions
Page number	8
Type of Comment	Proposed Change

Comment	<p>This methodology is applicable under the following conditions: 1. Project activities must include at least one eligible capture activity and at least one eligible storage activity. Project activities must transport the project CO2 stream to storage sites that are not co-located or are not adjoining the capture sites using an eligible transport activity.</p> <p>Regarding the above statement, If the storage and capture sites are c-located or adjoining, many expecting projects would be inapplicable. Since the nature of carbon credits is for technology promotion to mitigate climate change, even if the capture and storage sites are co-located or adjoining, they should be applicable for crediting.</p>
Cluster	D
Response from Methodology Developer	<p>Please refer to response no 20</p> <p>"The current framework ensures the safe and efficient transport of captured CO2 to eligible storage sites, particularly when these sites are not co-located or directly adjacent to the capture facilities. As detailed in the applicability conditions, project activities must encompass both an eligible capture and storage activity. However, if the storage site is co-located or directly adjacent to the capture site, there is no requirement for a separate transport activity.</p> <p>Text has been revised based on the comment: "Project activities must include at least one eligible capture activity and at least one eligible storage activity. If the project activity is not co-located or not adjoining the capture site, it must use an eligible transport activity. However, in situations where the storage sites are co-located or are adjoining the capture sites, the capture module boundary is directly attached to the storage module boundary, and thus, the project proponent could cover all equipment under one project boundary without defining a separate module boundary for transport."</p>
Aster Global Findings - Round 1	<p>The methodology developer has revised the language to make it clear that a transport activity is not required if the capture and storage sites are co-located or are adjoining.</p> <p>After the findings were closed, Verra modified the methodology. These changes were driven by Verra requirements, moving guidance to the modules, updating to the current Verra style guide and to align the methodology to the ICVCM.</p>

Item	70
Comment Number	106
Related Document	Methodology for CCS
Entity	Japan Organization for Metals and National Cooperation
Section	7 - Additionality
Page number	17
Type of Comment	General Feedback

Comment	<p>1) The project type must not be common practice in the respective sector and country.</p> <ul style="list-style-type: none"> • Common practice is defined as the project activity implemented in more than 20% of comparable source facilities in the sector and country. <p>Regarding the above statement, please indicate why the threshold for common practice is set at 20%; although the effectiveness of CCS for climate change mitigation has been confirmed, it is a costly technology, and therefore the threshold for common practice should be higher to promote its deployment.</p>
Cluster	F
Response from Methodology Developer	<p>Please refer to response no. 13.</p> <p>"Our decision to set the threshold at 20% for defining common practice is based on the intention to uphold the integrity and credibility of carbon credits. Additionally, it's worth noting that the CDM Tool 24 "Common Practice" also employs a factor of 0.2 (20%) for determining common practice. The granularity of our approach ensures the 20% criterion is applied distinctly across sectors and countries. In regions where BECCS is in its infancy, projects can still qualify as additional, even if they are prevalent elsewhere. This country-specific approach accommodates different regions' challenges, regulatory landscapes, and market conditions. Also note that our framework excludes similar projects under validation, awaiting registration, or registered under any GHG crediting program from the common practice analysis. This means that only non-carbon crediting BECCS projects will be counted towards the 20% market penetration. "</p>
Aster Global Findings Round 1	- The methodology developer updated the additionality section, clarifying the options and streamlining the process. No further action is needed

Item	71
Comment Number	107
Related Document	Methodology for CCS
Entity	Japan Organization for Metals and National Cooperation
Section	7 - Additionality
Page number	16
Type of Comment	General Feedback
Comment	Scientific reasons need to be provided for the IRR of 21%.
Cluster	F

Response from Methodology Developer	<p>Please refer to response no. 6.</p> <p>"Currently, only 30 capture facilities with a total capture capacity of merely 42.5 million tons per year are currently operational (https://status22.globalccsinstitute.com/wp-content/uploads/2022/11/Global-Status-of-CCS-2022_Download.pdf). Most large-scale CCS projects built over the last decade have been a commercial failure. They are either out of service or significantly performing below expectations. Examples are the Petro Nova project and Boundary Dam project in the US (https://sgp.fas.org/crs/misc/R44902.pdf). Therefore, those projects need to be considered as high risk investment projects similar to venture capital investments. In "How Venture Capital Works" Bob Dizer highlights that the venture capital model is designed to commercialize technologies, some of which might have previously remained dormant in corporations or academia.</p> <p>The methodology uses a comprehensive multi-step approach to assess additionality, including regulatory surplus, implementation barriers, and common practice considerations. The 21% value is explicitly applied when a company has no prior experience undertaking projects with technologies/business models with risks similar to the project activity. It is intended to serve as a proxy for the returns expected when applying the Investment Analysis for the project activity.</p> <p>The choice to use venture capital investments as a reference point stems from the inherently high risks associated with such investments, even if they are undertaken by large energy companies. The document "How Venture Capital Works" presents a range of IRR values over five years, which span from 0% to 50%. This range offers a broad spectrum of potential returns, indicating the variability and uncertainty inherent in the venture capital landscape. 21% fits within this spectrum, closer to the mid-range. The methodology suggests that an IRR benchmark of 21% would be a reasonably robust return, especially considering the higher end of the scale is 50%.</p> <p>Furthermore, the methodology prioritizes using internal company benchmarks/expected returns. These benchmarks reflect risks related to specific project scenarios, such as immature technologies or systems of notable complexity. Such benchmarks are derived from the company's prior investments in activities with similar risks. Hence, the methodology is sensitive to individual</p>
Aster Global Findings Round 1	<p>The methodology developer updated the additionality section, clarifying the options and streamlining the process. No further action is needed</p> <p>After the findings were closed, Verra modified the methodology. These changes were driven by Verra requirements, moving guidance to the modules, updating to the current Verra style guide and to align the methodology to the ICVCM.</p>

Item	72
Comment Number	108
Related Document	Methodology for CCS
Entity	INPEX Corporation
Section	8.1.3 - Measurement Based on Volumetric Flow Rate
Page number	19
Type of Comment	General Feedback
Comment	For the definition of FRvol, x (STP) in Equation (4), "Volumetric flow rate measured by flow meter x at STP conditions" is enough, since Equation (6) explains Frvol, x at actual conditions.
Cluster	G

Response from Methodology Developer	The definition of FRvol,x(STP) as "Volumetric flow rate measured by flow meter x at actual conditions and converted to STP conditions" provides a comprehensive understanding of the variable's meaning. By specifying that it's measured "at actual conditions and converted to STP conditions," the text ensures that readers understand both the measurement conditions and the context in which the flow rate should be applied.
Aster Global Findings - Round 1	The development team demonstrated the irrelevance of the comment by explaining that if the current language was adjusted (as suggested) then it may cause confusion for the reader.

Item	73
Comment Number	109
Related Document	Methodology for CCS
Entity	INPEX Corporation
Section	8.1.3 - Measurement Based on Volumetric Flow Rate
Page number	20
Type of Comment	General Feedback
Comment	In Equation (6), please check the definition of ρ_x (P,T) if "Density of CO2 at actual conditions" is correct (or if " ρ_{CO2x} (P,T)" is appropriate), also please add the definition of ρ_x (STP).
Cluster	G
Response from Methodology Developer	The notation of the density has been revised for clarity.
Aster Global Findings - Round 1	It is unclear to the assessment team what if any changes were made based on the comment.
Aster Global Round 1 Findings (NCR/CL/OFI)	CL: Please clarify in line with the finding.
Round 1 Response from Methodology Developer	The notation is correct and refer to density at actual conditions for temperature T and pressure P
Aster Global Round 2 Findings (NCR/CL/OFI)	Text has been updated. Finding is closed.

Item	74
Comment Number	110
Related Document	Methodology for CCS
Entity	INPEX Corporation
Section	8.3 - Leakage
Page number	21
Type of Comment	Proposed Change
Comment	Typos in Equation (8), PE should be corrected to LE, respectively for leakage emissions from capture, transport and storage, and the total of them.
Cluster	G
Response from Methodology Developer	Equation (8) has been revised.
Aster Global Findings - Round 1	The development team updated equation (8) in line with the suggestions from the commenter.

Item	75
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Comment Number	111
Related Document	Methodology for CCS
Entity	INPEX Corporation
Section	8.4 - Emission Reductions and Removals
Page number	21
Type of Comment	Proposed Change
Comment	In Equation (9), the capital "Y" for subscript of LE should be changed to a small "y".
Cluster	G
Response from Methodology Developer	Equation (9) has been revised.
Aster Global Findings Round 1	- It is unclear to the assessment team if the requested change has been made to equation (9) per the commenters suggestion as the subscript for Leakage Emissions is still capitalized.
Aster Global Round 1 Findings (NCR/CL/OFI)	1 CL: Please clarify in line with the finding.
Round 1 Response from Methodology Developer	It is revised and changes were made due to comment.
Aster Global Round 2 Findings (NCR/CL/OFI)	2 Text has been updated. Finding is closed.

Item	76
Comment Number	112
Related Document	Methodology for CCS
Entity	INPEX Corporation
Section	9.1 - Data and Parameters Available at Validation
Page number	23
Type of Comment	General Feedback
Comment	ρ_x (STP) is explained by "Density of CO ₂ at STP", whilst ρ_{CO_2x} (STP) in Equation (4) is also explained by "Density of CO ₂ at STP conditions". Please correct whichever for consistency.
Cluster	H
Response from Methodology Developer	Please refer to response no. 109. "The notation of the density has been revised for clarity."
Aster Global Findings Round 1	- It is unclear to the assessment team what if any changes were made based on the comment.
Aster Global Round 1 Findings (NCR/CL/OFI)	1 CL: Please clarify in line with the finding.
Round 1 Response from Methodology Developer	Notation of the density has been updated as per the comment.
Aster Global Round 2 Findings (NCR/CL/OFI)	2 Text has been updated. Finding is closed.

Item	77
Comment Number	113
Related Document	Methodology for CCS
Entity	INPEX Corporation
Section	9.2 - Data and Parameters Monitored

Page number	29
Type of Comment	General Feedback
Comment	Please check the definition of $\rho_x(P,T)$ if "Density of CO2 at actual conditions" is correct (or if " $\rho_{CO_2}(P,T)$ " is appropriate),
Cluster	H
Response from Methodology Developer	Please refer to response no. 109. "The notation of the density has been revised for clarity. "
Aster Global Findings - Round 1	It is unclear to the assessment team what if any changes were made based on the comment.
Aster Global Round 1 Findings (NCR/CL/OFI)	CL: Please clarify in line with the finding.
Round 1 Response from Methodology Developer	Notation of the density has been updated as per the comment. t and refer to density at actual conditions for temperature T and pressure P
Aster Global Round 2 Findings (NCR/CL/OFI)	Text has been updated. Finding is closed.

Item	78
Comment Number	114
Related Document	Methodology for CCS
Entity	INPEX Corporation
Section	8.2 - Project Emissions
Page number	20
Type of Comment	General Feedback
Comment	Project emissions are very simple equation. It's hard to review without "Tool for Baseline Quantification and Allocation of Project Emissions in Projects with VCS and non VCS CO 2 flows in Carbon Capture and Storage Projects". In section 1, it is explained that this guidance is under development. Could you please let us know the latest schedule when the guidance will be published?
Cluster	G
Response from Methodology Developer	Please refer to response no 70. "Please refer to response no 71. "Including non-VCS CO2 streams, especially those utilizing shared CCS hubs where CO2 streams originate from various projects, is a strategic approach that enhances the practicality and scalability of CCS+ framework. Recognizing the potential risks, such as a ton of non-VCS CO2 potentially producing 0.9 ton of CO2 emissions, methodology employs rigorous procedures for monitoring, quantifying, and controlling the entry and influence of non-VCS CO2 streams on project outcomes. The "Tool for Accounting non-VCS CO2 in CCS Projects" establishes detailed criteria and procedures for the quantification and allocation of project emissions (PE _{non-VCS CO2y}) and leakage emissions (LE _{non-VCS CO2y}) for projects where non-VCS CO2 flows through the project boundary. ""
Aster Global Findings - Round 1	It is unclear to the assessment team why the development teams response does not address the question asked by the commenter in the last line.
Aster Global Round 1 Findings (NCR/CL/OFI)	CL: Please clarify in line with the finding.

Round 1 Response from Methodology Developer	Timelines for the tools is not certain at the time of the response. Tools were already gone through public consultation so commentar should have seen the tools.
Aster Global Round 2 Findings (NCR/CL/OFI)	Finding is closed.

Item	79
Comment Number	115
Related Document	Methodology for CCS
Entity	INPEX Corporation
Section	8.3 - Leakage
Page number	21
Type of Comment	Proposed Change
Comment	The Equation (8) is same as equation (7) showing the project emissions. It should use "L"E to describe leakage, not "P"E.
Cluster	G
Response from Methodology Developer	Please refer to response no 110. "Equation (8) has been revised. "
Aster Global Findings - Round 1	The development team updated equation (8) in line with the suggestions from the commenter.

Item	80
Comment Number	116
Related Document	Methodology for CCS
Entity	INPEX Corporation
Section	8.4 - Emission Reductions and Removals
Page number	21
Type of Comment	Proposed Change
Comment	Are emission reduction contributions by emission "reduction" and emission "removal" same? Weighting and making defference should be better to promote emission "removal" projects.
Cluster	G
Response from Methodology Developer	Carbon Dioxide Removal (Removal) is defined by VERRA as a long-term atmospheric benefit that is attributable to project activities. These activities are known to increase durably-stored carbon stocks in geological, terrestrial, ocean, or product carbon pools, net of associated project and leakage emissions. It is characterized by the anthropogenic enhancement of biological or geochemical sinks and the transfer of biogenic carbon from short-term to long-term carbon pools. The exclusion of natural CO2 uptake and the maintenance of declining carbon stocks is specified. It is represented that one metric tonne of CO2 removed from the atmosphere corresponds to one carbon dioxide removal. An elaborate procedures for calculating both Greenhouse Gas (GHG) emission reductions ("reductions") and carbon dioxide removals ("removals") from eligible project activities is provided by the VT00XX: Tool for Differentiating Reductions and Removals in CCS Projects .

Aster Global Findings Round 1	-	The methodology development teams response clearly details the differences between removals and reductions, per the VCS definitions. The referenced methodology/module is not yet complete, and future references cannot be assessed. The Assessment team notes that the referenced methodology/module appears to be a reasonable location to address the commentors concern.
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Item	81	
Comment Number	117	
Related Document	Methodology for CCS	
Entity	INPEX Corporation	
Section	9.2 - Data and Parameters Monitored	
Page number	24	
Type of Comment	Proposed Change	
Comment	Information about installing points of each instrument to measure temperature, pressure, mass volume, etc. should be described clearly in the tables.	
Cluster	H	
Response from Methodology Developer	The methodology uses the table format provided in the VERRA methodology template.	
Aster Global Findings Round 1	-	The methodology uses the correct tables provided by VERRA, however, it is unclear to the assessment team what if any changes to descriptions of each parameter were made based on the commenters suggestion.
Aster Global Round 1 Findings (NCR/CL/OFI)	1	CL: Please clarify in line with the finding.
Round 1 Response from Methodology Developer		No changes has been made since it is not possible for methodology team to identify monitoring points for each parameter. However mandatory injection point and its location is defined in the storage module. Where the baseline emissions are calculated.
Aster Global Round 2 Findings (NCR/CL/OFI)	2	Finding is closed. See storage module and tools for details on monitoring and injection point requirements.

Item	82	
Comment Number	118	
Related Document	Methodology for CCS	
Entity	INPEX Corporation	
Section	9.3 - Description of the Monitoring Plan	
Page number	30	
Type of Comment	Proposed Change	
Comment	What is the "Origin of the data"? If this means the monitoring point or location, it should be better to use alternative wording to make it clearer.	
Cluster	H	
Response from Methodology Developer	As per the VERRA methodology template, source of data means the source of data that is used for the parameters in the calculations.	
Aster Global Findings Round 1	-	The methodology development teams response correctly identifies and defines the "source of data" section of each table used to help describe each data/parameter.

Item	83
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Comment Number	123
Related Document	Methodology for CCS
Entity	Orsted
Section	4 - Applicability Conditions
Page number	7
Type of Comment	General Feedback
Comment	"5. Capture activities must have a concentrated CO 2 stream of at least 95% purity delivered to the storage site for geologic sequestration" Why is it important in terms of certification? As long as the accounting and settlement only report CO2 actually stored there should be no issue. Also, what if the storage site offers clean-up? It could be effective centralization, albeit technically challenging.
Cluster	D
Response from Methodology Developer	Please refer to response no 67. Text has been revised based on the comment: "6. Capture activities must ensure that the CO2 stream delivered to the storage site meets the following requirements: oA minimum concentration of 95% purity and o complies with the applicable regulations of the national/regional/local project jurisdiction related to CO2 purity and the concentration of co-injected substances." "
Aster Global Findings Round 1	- The Methodology developer added a bullet requiring compliance with applicable regulations, but did not address the two questions raised in the comment.
Aster Global Round 1 Findings (NCR/CL/OFI)	CL: Please address the two questions put forward by the commenter.
Round 1 Response from Methodology Developer	Current text do not requires 95% only also local regulation requirements are added. So the conditions of the commenter are defined in the local regulations, it should be still eligible.
Aster Global Round 2 Findings (NCR/CL/OFI)	Text has been updated allowing for commenters concerns to be eligible. Finding is closed.

Item	84
Comment Number	124
Related Document	Methodology for CCS
Entity	Orsted
Section	4 - Applicability Conditions
Page number	9
Type of Comment	General Feedback
Comment	"Divert CO 2 streams from other storage or utilization activities;" What are the hard criteria for diverting CO2 stream from other storage or utilization? If CCU is a potential future alternative use case for the carbon, is the CO2 stream 'diverted' for CCS? Or is it only relevant when a CO2 stream is already 'diverted' to another activity before the CCS activity is established?
Cluster	D

Response from Methodology Developer	“Other” (storage or utilization activities) are to be understood as sources of CO2 outside of the project activity boundary that have been captured by activities that are not part of the project activity. The stipulation against diverting other CO2 streams is in place to ensure the integrity and transparency of the carbon capture and storage (CCS) methodology. The principle here is to avoid potential double counting or misallocation of emission reductions or removals.
Aster Global Findings Round 1	The methodology developer clearly states that activities outside of the project activity/project boundary cannot be diverted and incorporated into the current project activity as such an activity could lead to double counting or misallocation of emission reductions/removals.

Item	85
Comment Number	125
Related Document	Methodology for CCS
Entity	Orsted
Section	5 - Project Boundary
Page number	12
Type of Comment	General Feedback
Comment	Materiality Threshold. 2% is a relatively high value. For industrial plants and similar it should be possible to use a lower value threshold.
Cluster	E
Response from Methodology Developer	Please refer to response 26. "VCS Methodology Requirements v 4.4, particularly paragraph 3.7.3, permits the exclusion of leakage sources deemed de minimis, i.e., insignificant to the overall GHG emission profile of a project. VCS Methodology Requirements also refers to the CDM A/R methodological tool, "Tool for testing significance of GHG emissions in A/R CDM project activities," to determine the significance of the leakage emission source. According to this tool, GHG emission sources may be considered negligible if they account for less than 5% of the total decreases in carbon pools and increases in emissions or less than 5% of net anthropogenic removals by sinks, opting for the lower threshold. In the development of the CCS Methodology, a detailed analysis was undertaken to ensure that emissions from fabrication, construction, disposal, and decommissioning fell below this significance threshold. To adopt a conservative approach and ensure that the methodology remains focused on the most substantial emissions, the de minimis threshold was adjusted from the suggested 5% to a more stringent 2%. This decision was made to prioritize accuracy in GHG accounting while maintaining practicality and feasibility in project implementation and monitoring."
Aster Global Findings Round 1	The developers took due account of the comment and detailed the steps taken to ensure conservativeness by lowering the CDM recommended deminimis threshold from 5% to 2%. The developers also detailed the analysis which excluded the emissions associated with construction/fabrication.

Item	86
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Comment Number	126
Related Document	Methodology for CCS
Entity	Orsted
Section	6 - Baseline Scenario
Page number	13
Type of Comment	General Feedback
Comment	Greenfield should be more clearly defined. Important to notice that capture plants can be installed as a retrofit to an existing point source or together with a newbuilt point source. Are these both greenfield or how is it defined?
Cluster	E
Response from Methodology Developer	Greenfield and brownfield definitions for source facilities are defined in the respective capture modules. Other modules and tools that cover related CCS activities are under development.
Aster Global Findings - Round 1	The referenced methodology/module is not yet complete, and future references cannot be assessed. The Assessment team notes that the referenced methodology/module appears to be a reasonable location to address the commentors concern.

Item	87
Comment Number	127
Related Document	Methodology for CCS
Entity	Orsted
Section	8.3 - Leakage
Page number	21
Type of Comment	General Feedback
Comment	Error in formula. Should be LE not PE.
Cluster	G
Response from Methodology Developer	Formula has been revised.
Aster Global Findings - Round 1	The development team updated equation (8) in line with the suggestions from the commenter.

Item	88
Comment Number	135
Related Document	Methodology for CCS
Entity	E.ON Energy Projects
Section	5 - Project Boundary
Page number	12
Type of Comment	General Feedback
Comment	Any data/quantification to substantiate the exclusion of emissions from production and transport of construction materials?
Cluster	E

Response from Methodology Developer	<p>Please refer to response no 26.</p> <p>"VCS Methodology Requirements v 4.4, particularly paragraph 3.7.3, permits the exclusion of leakage sources deemed de minimis, i.e., insignificant to the overall GHG emission profile of a project. VCS Methodology Requirements also refers to the CDM A/R methodological tool, "Tool for testing significance of GHG emissions in A/R CDM project activities," to determine the significance of the leakage emission source. According to this tool, GHG emission sources may be considered negligible if they account for less than 5% of the total decreases in carbon pools and increases in emissions or less than 5% of net anthropogenic removals by sinks, opting for the lower threshold. In the development of the CCS Methodology, a detailed analysis was undertaken to ensure that emissions from fabrication, construction, disposal, and decommissioning fell below this significance threshold. To adopt a conservative approach and ensure that the methodology remains focused on the most substantial emissions, the de minimis threshold was adjusted from the suggested 5% to a more stringent 2%. This decision was made to prioritize accuracy in GHG accounting while maintaining practicality and feasibility in project implementation and monitoring."</p>
Aster Global Findings Round 1	<p>The developers took due account of the comment and detailed the steps taken to ensure conservativeness by lowering the CDM recommended de minimis threshold from 5% to 2%. The developers also detailed the analysis which excluded the emissions associated with construction/fabrication.</p>

Item	89
Comment Number	136
Related Document	Methodology for CCS
Entity	E.ON Energy Projects
Section	4 - Applicability Conditions
Page number	9
Type of Comment	General Feedback
Comment	Clarity is needed on applicability condition with regard to projects with mixed-use of CO2. When only part of the captured CO2 from a single source is used for storage and the rest is used for other purposes (e.g., CCU), is the project eligible? Can this be deemed two separate project activities?
Cluster	D
Response from Methodology Developer	The methodology focuses on the capture and subsequent storage of CO2 in geological storage complexes. A methodology for long-term CO2 utilization is currently under development in the CCS+ Initiative. It will be available for public consultation in the future. It will then clarify if and how mixed usage of CO2 is an eligible project activity.
Aster Global Findings Round 1	The referenced methodology/module is not yet complete, and future references cannot be assessed. The Assessment team notes that the referenced methodology/module appears to be a reasonable location to address the commentors concern.

Item	90
Comment Number	137

Related Document	Methodology for CCS
Entity	E.ON Energy Projects
Section	7 - Additionality
Page number	14
Type of Comment	General Feedback
Comment	<p>Clarity needed on how to conduct investment analysis for projects with mixed-use of CO2.</p> <p>E.g., When part of the CO2 captured from the project capture facility is sold or used for utilization, should the revenues from the direct sales and/or CCU end-products be incorporated in investment analysis as set out in Provision 2), or should the costs of the capture plant prorated based on the usage rate as required by Provision 3)</p>
Cluster	F
Response from Methodology Developer	<p>In cases where part of the CO2 captured from the project capture facility is sold or utilized, the revenues derived from direct sales and/or Carbon Capture and Utilization (CCU) end-products should indeed be incorporated into the investment analysis, as per Provision 2). This approach ensures that all potential revenue streams that can impact the project's financial viability are considered.</p> <p>Provision 3), primarily addresses scenarios where shared infrastructure is used, and the economics of a project are affected by the usage rate of transport and storage facilities. If a project activity involves prorating costs based on the usage rate, it would apply to the portion of CO2 transported and stored. However, for the portion of CO2 sold or utilized, the associated revenues would still be considered under Provision 2).</p>
Aster Global Findings Round 1	- The methodology developer updated the additionality section, clarifying the options and streamlining the process. No further action is needed

Item	91
Comment Number	138
Related Document	Methodology for CCS
Entity	E.ON Energy Projects
Section	8.1 - Baseline Emissions
Page number	21
Type of Comment	General Feedback
Comment	How shall the losses during e.g. transport, loading, etc be measured.
Cluster	G
Response from Methodology Developer	Any loss of CO2 is deducted from the overall calculation of GHG emission reductions or removals since only injected CO2 volumes are quantified as the baseline emissions.
Aster Global Findings Round 1	- The development teams response takes due account of the comment by noting that losses during transport etc. are included as reductions and/or removals are only calculated at the injection site.

Item	92
Comment Number	139
Related Document	Methodology for CCS

Entity	E.ON Energy Projects
Section	8.3 - Leakage
Page number	21
Type of Comment	Proposed Change
Comment	Typos, in Equation (8), LE instead of PE shall be used.
Cluster	G
Response from Methodology Developer	Equation (8) has been revised.
Aster Global Findings - Round 1	The development team updated equation (8) in line with the suggestions from the commenter.

Item	93
Comment Number	140
Related Document	Methodology for CCS
Entity	E.ON Energy Projects
Section	8.3 - Leakage
Page number	
Type of Comment	General Feedback
Comment	We are aware that Verra is also conducting a public consultation on Proposed Changes to the program, where construction emissions is one of the topics. Will the CCS methodology be revised accordingly later on?
Cluster	G
Response from Methodology Developer	After VERRA finalizes the program revision, CCS+ will re-evaluate the methodology and modules to integrate the changes made to the standard.
Aster Global Findings - Round 1	The development teams response takes due account of the comment by noting changes will be made as needed after VERRA finalizes the program revisions.

Item	94
Comment Number	150
Related Document	Methodology for CCS
Entity	Velocys PLC
Section	4 - Applicability Conditions
Page number	8 and 9
Type of Comment	Proposed Change
Comment	The list of eligible CO2 capture activities should be expanded to mention capture of CO2 co-produced in the conversion of wastes (including both biogenic and fossil material as in Municipal Solid Waste) into products such as fuels and chemicals. The current list appears to include the biogenic fraction under the last bullet, although it isn't given as a specific example, but it does not appear to include the fossil fraction - it covers fossil flue gases from industrial processes but this is different.
Cluster	D

Response from Methodology Developer	Please refer to response 53. "The BECCS module for power and heat applications are in the public consultation (VMD00XX: Module for CO2 Capture From Bioenergy Combustion). BECCS module for other processes is under development (VMD00XX: Module for CO2 Capture from Bioproduction Processes). So there will be two BECCS module one is for post-combustion the other one is for bioproducts. Question is not relevant to this public consultation."
Aster Global Findings - Round 1	The referenced methodology/module is not yet complete, and future references cannot be assessed. The Assessment team notes that the referenced methodology/module appears to be a reasonable location to address the commentors concern.

Item	95
Comment Number	151
Related Document	Methodology for CCS
Entity	ConocoPhillips
Section	3 - Definitions
Page number	5
Type of Comment	Proposed Change
Comment	DACCS is referenced in doc but only "DAC" is defined upfront. Both are used throughout document and should be defined
Cluster	C
Response from Methodology Developer	Abbreviation has been revised to DAC.
Aster Global Findings - Round 1	The methodology development team took due account of the comment, by removing all references to DACCS.

Item	96
Comment Number	152
Related Document	Methodology for CCS
Entity	ConocoPhillips
Section	3 - Definitions
Page number	5
Type of Comment	Proposed Change
Comment	Consider defining "additionality" upfront in the definitions section or refer to section Standards.
Cluster	C
Response from Methodology Developer	Additionality is defined in the VCS Standard document.
Aster Global Findings - Round 1	The methodology development team took due account of the comment by stating additionality is already defined in the VCS standard documents.

Item	97
Comment Number	153
Related Document	Methodology for CCS
Entity	ConocoPhillips
Section	3 - Definitions
Page number	6

Type of Comment	Proposed Change
Comment	Suggest adding a definition of for permanance or refer to section of Standards.
Cluster	C
Response from Methodology Developer	Please refer to response 65. "Requirements of permanence are defined in the VCS GCS Requirements and Non-permanence risk tool. Question is not relevant to this public consultation."
Aster Global Findings Round 1	- The methodology development team took due account of the comment by stating permanence is already defined in VCS GCS Requirements and Non-permanence risk tool.

Item	98
Comment Number	154
Related Document	Methodology for CCS
Entity	ConocoPhillips
Section	4 - Applicability Conditions
Page number	9
Type of Comment	General Feedback
Comment	4. The eligible storage activities include storage in saline aquifers and depleted fields. Please clarify if these include EOR?
Cluster	D
Response from Methodology Developer	EOR activities are currently not covered under the current CCS+ framework.
Aster Global Findings Round 1	- The methodology developer clarified that EOR activities are not included in the CCS methodology framework.

Item	99
Comment Number	155
Related Document	Methodology for CCS
Entity	ConocoPhillips
Section	4 - Applicability Conditions
Page number	9
Type of Comment	General Feedback
Comment	Methodology is not applicable for project activities that utilize captured CO2 as a feedstock for products or services (i.e., carbon capture and utilization). Please clarify if this includes EOR.
Cluster	D
Response from Methodology Developer	Please refer to response no 154. "EOR activities are currently not covered under the current CCS+ framework. "
Aster Global Findings Round 1	- The methodology developer clarified that EOR activities are not included in the CCS methodology framework. The assessment team also notes that a separate CCU methodology is currently under development, but is not yet complete so is outside the scope of this assessment, however appears to be a reasonable location to address the commentors concerns.

Item	100
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Comment Number	156
Related Document	Methodology for CCS
Entity	ConocoPhillips
Section	5 - Project Boundary
Page number	12
Type of Comment	General Feedback
Comment	Inconsistency between this document which excludes "production and transport of equipment and materials used for construction of project facilities". The Module for CO2 Capture from Air, Figure 2 page 9 assess these as leakage.
Cluster	E
Response from Methodology Developer	The figure has been revised for consistency.
Aster Global Findings - Round 1	Figure 2 in the DAC module contains no mention of "production and transport of equipment and materials used for construction of project facilities" which aligns with these emissions being excluded in the Meth Framework.

Item	101
Comment Number	157
Related Document	Methodology for CCS
Entity	ConocoPhillips
Section	7 - Additionality
Page number	14
Type of Comment	Proposed Change
Comment	1) Requires transport in a vertically integrated project to be 'treated as costs to the capture activity'. Please clarify that co-located projects may not include a transport activity.
Cluster	F
Response from Methodology Developer	<p>Please refer to response no 20.</p> <p>"The current framework ensures the safe and efficient transport of captured CO2 to eligible storage sites, particularly when these sites are not co-located or directly adjacent to the capture facilities. As detailed in the applicability conditions, project activities must encompass both an eligible capture and storage activity. However, if the storage site is co-located or directly adjacent to the capture site, there is no requirement for a separate transport activity.</p> <p>Text has been revised based on the comment: "Project activities must include at least one eligible capture activity and at least one eligible storage activity. If the project activity is not co-located or not adjoining the capture site, it must use an eligible transport activity. However, in situations where the storage sites are co-located or are adjoining the capture sites, the capture module boundary is directly attached to the storage module boundary, and thus, the project proponent could cover all equipment under one project boundary without defining a separate module boundary for transport."</p>

Aster Global Findings Round 1	<p>The response is sufficient. The methodology developer updated the additionality section, clarifying the options and streamlining the process. No further action is needed.</p> <p>After the findings were closed, Verra modified the methodology. These changes were driven by Verra requirements, moving guidance to the modules, updating to the current Verra style guide and to align the methodology to the ICVCM.</p>
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Item	102
Comment Number	158
Related Document	Methodology for CCS
Entity	ConocoPhillips
Section	7 - Additionality
Page number	16
Type of Comment	General Feedback
Comment	Appropriate benchmark determination: In the case of point source capture where there are multiple parties involved in the overall value chain (capture, transport and sequestration), then information sharing/transparency between parties would be critical to validate the IRR of the overall project. This would be further complicated in the case of a hub that involves multiple emitters and aggregation to a common storage site.
Cluster	F
Response from Methodology Developer	<p>The methodology explicitly describes the scope of the investment analysis. In Step 2, it is mentioned that the assessment should be done from the perspective of the capture activity. The costs related to transport and storage must be treated as costs to the capture activity. This ensures that all financial aspects are considered from diverse operatorship or vertically integrated projects. This provision acknowledges capturing the entire value chain, including multiple parties.</p> <p>As stated in point 3 of Step 2, if the shared infrastructure is relevant, costs or revenues must be prorated based on the estimated usage rate of transport and storage by each capture activity. If a hub involves multiple emitters, the respective costs and revenues must be proportionally allocated to ensure an accurate financial assessment.</p> <p>While the text does not directly mention the necessity of information sharing/transparency between the parties, the methodology's requirement to account for all relevant financial parameters (revenues, costs, subsidies, etc.) implicitly necessitates collaboration and transparency.</p>
Aster Global Findings Round 1	<p>The response is sufficient. The methodology developer updated the additionality section, clarifying the options and streamlining the process. No further action is needed</p>

Item	103
Comment Number	159
Related Document	Methodology for CCS
Entity	ConocoPhillips
Section	8.3 - Leakage
Page number	21
Type of Comment	Proposed Change

Comment	Equation 8 should be LE, not PE
Cluster	G
Response from Methodology Developer	Equation 8 has been revised.
Aster Global Findings Round 1	- The development team updated equation (8) in line with the suggestions from the commenter.

Item	104
Comment Number	192
Related Document	Methodology for CCS
Entity	Carbonfuture
Section	8.3 - Leakage
Page number	21
Type of Comment	Proposed Change
Comment	terms in equation 8 should be LE not PE
Cluster	G
Response from Methodology Developer	Equation 8 has been revised.
Aster Global Findings Round 1	- The development team updated equation (8) in line with the suggestions from the commenter.

Item	105
Comment Number	193
Related Document	Methodology for CCS
Entity	Carbonfuture
Section	3 - Definitions
Page number	5
Type of Comment	Proposed Change
Comment	Definition of BECCS does not mention the storage, it should be added.
Cluster	C
Response from Methodology Developer	Please refer to response 53. "The BECCS module for power and heat applications are in the public consultation (VMD00XX: Module for CO2 Capture From Bioenergy Combustion). BECCS module for other processes is under development (VMD00XX: Module for CO2 Capture from Bioproduction Processes). So there will be two BECCS module one is for post-combustion the other one is for bioproducts. Question is not relevant to this public consultation."
Aster Global Findings Round 1	- It is unclear to the assessment team how the development teams response properly addresses the comment, and what if any changes were made to the BECCS definition. The assessment team notes the word "storage" is in the current definition.
Aster Global Round 1 Findings (NCR/CL/OFI)	CL: Please clarify in line with the finding.
Round 1 Response from Methodology Developer	Definition is revised to "The application of Carbon Dioxide Capture and Storage (CCS) technology to bioenergy conversion process." as per the commentor's suggestion.

Aster Global Round 2 Findings (NCR/CL/OFI)	Definition has been moved to the BECCS modules, which appears to be a reasonable place for the definition. Definition will be reviewed during that assessment. Finding is closed.
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Item	106
Comment Number	194
Related Document	Methodology for CCS
Entity	Carbonfuture
Section	4 - Applicability Conditions
Page number	8
Type of Comment	General Feedback
Comment	Are geological emissions such as CO2 from CaO production by burning CaCO3 covered in this methodology? If not, is there a plan for them in the future?
Cluster	D
Response from Methodology Developer	Please refer to response no 136. "The methodology focuses on the capture and subsequent storage of CO2 in geological storage complexes. A methodology for long-term CO2 utilization is currently under development in the CCS+ Initiative. It will be available for public consultation in the future. It will then clarify if and how mixed usage of CO2 is an eligible project activity."
Aster Global Findings Round 1	The methodology developers response does not answer the commentors question about inclusion of geological emissions of CO2 from burning CaCO3.
Aster Global Round 1 Findings (NCR/CL/OFI)	CL: Please address the commentors question.
Round 1 Response from Methodology Developer	It is not covered in the methodology.
Aster Global Round 2 Findings (NCR/CL/OFI)	Not applicable for this methodology. Finding is closed.

Item	107
Comment Number	201
Related Document	Methodology for CCS
Entity	Ecoengineers
Section	4 - Applicability Conditions
Page number	8
Type of Comment	Proposed Change
Comment	Applicability condition one (1) mentions: "Project activities must transport the project CO2 stream to storage sites that are not co-located or are not adjoining the capture sites using an eligible transport activity". We advise revising this sentence for clarity to the following: "Project activities that are not co-located or are not adjoining the capture sites must transport the project CO2 stream to storage sites using an eligible transport activity".
Cluster	D

Response from Methodology Developer	<p>Please refer to response no 20.</p> <p>"The current framework ensures the safe and efficient transport of captured CO2 to eligible storage sites, particularly when these sites are not co-located or directly adjacent to the capture facilities. As detailed in the applicability conditions, project activities must encompass both an eligible capture and storage activity. However, if the storage site is co-located or directly adjacent to the capture site, there is no requirement for a separate transport activity.</p> <p>Text has been revised based on the comment: "Project activities must include at least one eligible capture activity and at least one eligible storage activity. If the project activity is not co-located or not adjoining the capture site, it must use an eligible transport activity. However, in situations where the storage sites are co-located or are adjoining the capture sites, the capture module boundary is directly attached to the storage module boundary, and thus, the project proponent could cover all equipment under one project boundary without defining a separate module boundary for transport."</p>
Aster Global Findings Round 1	<p>The methodology developer has revised the language to make it clear that a transport activity is not required if the capture and storage sites are co-located or are adjoining.</p> <p>After the findings were closed, Verra modified the methodology. These changes were driven by Verra requirements, moving guidance to the modules, updating to the current Verra style guide and to align the methodology to the ICVCM.</p>

Item	108
Comment Number	202
Related Document	Methodology for CCS
Entity	Ecoengineers
Section	7 - Additionality
Page number	14
Type of Comment	General Feedback
Comment	<p>Unless it is an EOR project, it will be trivial to consider any implementation barrier in absence of the revenue of the carbon credits, when there is no usefulness of the CO2, then it would be certain that the project faces this barrier. A question we had is, is carbon stacking allowed if the project demonstrates that even when government subsidies are applied (i.e, 45Q in the US), as long as the project demonstrates there is still investment barriers, is the additionality addressed?</p>
Cluster	F

Response from Methodology Developer	As outlined in Step 2, the methodology explicitly addresses the need for project proponents to demonstrate an investment barrier. The investment barrier refers to the capital or investment return constraints that would prevent the project from being implemented without carbon credit revenues. This provision applies universally, regardless of the end-use of the captured CO2. The provided methodology emphasizes a detailed investment analysis that considers all financial aspects, including government revenues from subsidies (Point 2 of Step 2) and indirect economic benefits at the CO2 source facilities (Point 6 of Step 2). This ensures that the project's financial feasibility is assessed comprehensively, factoring in all potential revenue streams and costs
Aster Global Findings Round 1	The response is adequate. In addition the methodology developer updated the additionality section, clarifying the options and streamlining the process. No further action is needed

Item	109
Comment Number	203
Related Document	Methodology for CCS
Entity	Ecoengineers
Section	7 - Additionality
Page number	17
Type of Comment	Proposed Change
Comment	term DACCS is used, but such acronym is not defined, the term DAC is broadly used in the file instead.
Cluster	F
Response from Methodology Developer	The typo has been revised.
Aster Global Findings Round 1	The methodology developer updated the methodology by removing all references to "DACCS", which addresses the commenters confusion over the mixed usage of DACCS vs DAC

Item	110
Comment Number	204
Related Document	Methodology for CCS
Entity	Ecoengineers
Section	8.1 - Baseline Emissions
Page number	18
Type of Comment	General Feedback
Comment	Why do impurities matter in a supercritical fluid, isn't it the same situation for non supercritical ones? Aren't the impurities going to be the same % in composition?
Cluster	G

Response from Methodology Developer	The methodology acknowledges the importance of measuring impurities, especially in supercritical phase CO2. Supercritical fluids have unique properties distinct from their gas and liquid phases. For instance, the density of supercritical CO2 can be similar to a liquid, while its viscosity is closer to that of a gas. Impurities can significantly affect these properties, which in turn can influence the behaviour of the fluid during transport and storage. While impurities might exist in both supercritical and non-supercritical CO2, their impact on the physical properties and behaviour of the CO2 can be more pronounced in the supercritical phase.
Aster Global Findings Round 1	- The development teams response clearly explains why impurities are of a higher concern in the supercritical phase.

Item	111
Comment Number	205
Related Document	Methodology for CCS
Entity	Ecoengineers
Section	8.1 - Baseline Emissions
Page number	18
Type of Comment	General Feedback
Comment	Using the term "Baseline" to refer to gross injections minus injections which are not included under VCS is not appropriate. "Baseline" refers to the state of affairs with out project implementation. Rather it makes sense that it should be stated that the baseline is 0 and then doesn't impact the computation of project credits which should take into account all project emissions up and down the supply chain.
Cluster	G
Response from Methodology Developer	Please refer to response no 77. "The methodology defines the baseline scenario in a manner that reflects the absence of the project activity. For CO2 captured from the atmosphere or point sources, it's assumed that in the absence of the project, these emissions would have been released into the atmosphere or would not be captured. By monitoring the mass of injected CO2 as a proxy for baseline emissions and then deducting project and leakage emissions, the methodology provides a straightforward and effective means of calculating net GHG mitigation outcomes. This reflects a pragmatic approach to accounting, where the focus is on the net difference made by the project, thereby simplifying the monitoring and verification process."
Aster Global Findings Round 1	- The development teams response takes due account of the commentors concern by explaining the rational behind the baseline scenario. Specifically, in the absence of the project CO2 would remain in the atmosphere, making CO2 injected a quantifiable value of CO2 that would have not been removed without the project activity.

Item	112
Comment Number	206
Related Document	Methodology for CCS
Entity	Ecoengineers
Section	4 - Applicability Conditions

Page number	8
Type of Comment	Proposed Change
Comment	<p>Applicability condition one (1) mentions: "Project activities must transport the project CO2 stream to storage sites that are not co-located or are not adjoining the capture sites using an eligible transport activity".</p> <p>We suggest creating a definition for "co-located" that considers both distance between capture and injection sites as well as method of delivery (i.e. single user pipeline vs multi user)</p>
Cluster	D
Response from Methodology Developer	<p>Please refer to response no 20.</p> <p>"The current framework ensures the safe and efficient transport of captured CO2 to eligible storage sites, particularly when these sites are not co-located or directly adjacent to the capture facilities. As detailed in the applicability conditions, project activities must encompass both an eligible capture and storage activity. However, if the storage site is co-located or directly adjacent to the capture site, there is no requirement for a separate transport activity.</p> <p>Text has been revised based on the comment: "Project activities must include at least one eligible capture activity and at least one eligible storage activity. If the project activity is not co-located or not adjoining the capture site, it must use an eligible transport activity. However, in situations where the storage sites are co-located or are adjoining the capture sites, the capture module boundary is directly attached to the storage module boundary, and thus, the project proponent could cover all equipment under one project boundary without defining a separate module boundary for transport."</p>
Aster Global Findings Round 1	- The methodology developers revised language does not address the suggestion to add a definition for "co-located".
Aster Global Round Findings (NCR/CL/OFI)	1 CL: Please address the commentors suggestion to add a definition for "co-located"
Round 1 Response from Methodology Developer	Co-located refers to facilities that are situated within a maximum allowable distance from each other that supports direct connectivity and operational integration without the need for extensive transportation infrastructure.
Aster Global Round Findings (NCR/CL/OFI)	2 Text has been updated. Finding is closed. After the findings were closed, Verra modified the methodology. These changes were driven by Verra requirements, moving guidance to the modules, updating to the current Verra style guide and to align the methodology to the ICVCM.

Item	113
Comment Number	207
Related Document	Methodology for CCS
Entity	Ecoengineers
Section	8.3 - Leakage
Page number	21
Type of Comment	General Feedback

Comment	Conflating the term "Leakage" with "Reversal" causes confusion. Leakage refers to changes in emissions due to project activity outside the boundaries of the project. Reversal is the actual return of carbon to the atmosphere due to process, faulty infrastructure or other device failure.
Cluster	C
Response from Methodology Developer	The methodology follows the definition of "Leakage" within the context of GHG emissions. Per the VERRA methodology requirements, Leakage is the net change of anthropogenic GHG emissions outside the project boundary and is attributable to the project activities.
Aster Global Findings - Round 1	The assessment team notes that the word "Reversal" is not used in the methodology, and that usage of "leakage" in the methodology aligns with the VCS definition.

Item	114
Comment Number	214
Related Document	Methodology for CCS
Entity	Tensora
Section	9 - Monitoring
Page number	22-30
Type of Comment	Proposed Change
Comment	<p>We suggest that deformation in the overburden and/or at the ground surface be included as a required CCS monitoring technique. Changes in subsurface fluid pressure - such as through well operations or unintended leakage out of the reservoir - will cause deformation in the Above Zone Monitoring Interval (AZMI). Deformation monitoring using satellite measurements was used to detect a leak at the In Salah CO2 storage facility in Algeria (White, 2014). This monitoring technique is referred to as InSAR (Interferometric Synthetic Aperture Radar). Deformation may also be monitored through sensors installed in situ using seismometers and geophones, or strainmeters. Seismometers and geophones are routinely used for characterization and monitoring of storage sites. Strainmeters have also been demonstrated to be a valuable tool for reservoir characterization and monitoring. Deformation recorded by strainmeters installed at shallow depths (30 m) has been used to characterize reservoir properties and monitor fluid pressures in a reservoir at a much greater depth of 500 m. This approach could allow for fewer pressure monitoring wells in the reservoir, which could reduce drilling costs and the risk of leakage. Due to the successful detection of a leak using InSAR and the use of shallow deformation measurements to characterize and monitor well operations, deformation monitoring should be considered as a necessary monitoring requirement for CO2 storage.</p>
Cluster	H
Response from Methodology Developer	In the documentation provided, the monitoring plan for geological storage is elaborated upon in the GCS requirements. This document doesn't deeply address the overburden, but it does touch on the identification and parameters tied to confining zones or caprock. Any further discussions or adjustments on this topic will be pertinent to the GCS. It's essential to note that this isn't the focal point of the current public consultation.

Aster Global Findings Round 1	The development teams response correctly identifies the GCS requirements document published by VERRA which details requirements for monitoring storage sites, and notes that the methodology framework is not the appropriate location for the recommendations made by the commenter.
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Item	115
Comment Number	215
Related Document	Methodology for CCS
Entity	Honda R&D Co., Ltd.
Section	4 - Applicability Conditions
Page number	Page 9 4-7
Type of Comment	Proposed Change
Comment	<p>Reducing the total input energy of the CO2 capture equipment in various CCS system will reduce the upstream GHG of the input energy, and eventually contribute large GHG reduction amount in the total value chain of CCS system. Using heat management technology such as heat pumps is effective as a means of reducing input energy.</p> <p>The GWP of refrigerants is trending downward, but there are differences in the regulatory speeds in each country and region.</p> <p>The global warming impact of refrigerants can be suppressed by proper operation, management, and disposal so that they are not discharged into the atmosphere.</p> <p>Also, establishing standards that differ from the regulations of each country may hinder the rapid spread of CO2 capture equipment.</p> <p>Therefore, instead of restricting the GWP value of the refrigerant, we request that the article be changed to comply with the regulations of the country/region where the equipment is installed.</p>
Cluster	D
Response from Methodology Developer	<p>The methodology does specify the need for project facilities that utilize refrigerants to have a GWP below 5. The rationale behind this requirement is to ensure that while capturing and storing CO2, other potent GHGs are not inadvertently released. However, we understand the variability in regulations across different countries and regions and the importance of proper operation, management, and disposal of refrigerants.</p> <p>Text has been revised based on the comment:</p> <p>7. Where the project facilities include refrigeration systems that utilize industrial refrigerants, they must:</p> <ul style="list-style-type: none"> o Only use refrigerants that are not controlled substances under the Montreal Protocol (e.g., HCFCs) or under the Kigali Amendment (e.g., HFCs); o Ensure that the refrigerants comply with the applicable regulations of the country/region where the equipment is installed. o In cases where the country's regulations are less stringent, a GWP below 5 is recommended.

Aster Global Findings Round 1	- The developer added a requirement ensuring that any refrigerant use must meet local regulations as requested by the commenter. After the findings were closed, Verra modified the methodology. These changes were driven by Verra requirements, moving guidance to the modules, updating to the current Verra style guide and to align the methodology to the ICVCM.
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Item	116
Comment Number	216
Related Document	Methodology for CCS
Entity	Anew Climate, LLC
Section	1 - Sources
Page number	4
Type of Comment	Proposed Change
Comment	Anew suggests adding the Geologic Carbon Storage Non-Permanence Risk Tool and Geologic Carbon Storage Requirements to the list of "Other Modules and Tools" on page 4 of the Methodology for Carbon Capture and Storage.
Cluster	C
Response from Methodology Developer	Sources sections has been revised.
Aster Global Findings Round 1	- The developer added the GCS storage risk tool and the GCS requirement documents to the sources section as requested by the commenter

Item	117
Comment Number	217
Related Document	Methodology for CCS
Entity	Anew Climate, LLC
Section	3 - Definitions
Page number	7
Type of Comment	Proposed Change
Comment	Anew suggests amending the definition of a Saline Aquifer to remove the > 3,000 mg/L specification and instead defer to applicable regulations referenced on page 9 of Section 4.
Cluster	C
Response from Methodology Developer	Please refer to response no 235. "Text has been revised based on the comment: •The definition has been deleted in the Methodology •The definition stays in the Aquifer Storage Module •The applicability conditions for the Aquifer Storage Module reflect this definition."
Aster Global Findings Round 1	- The developer removed the definition from the Methodology and placed in the storage module, but the requirement of >3,000 mg/L has not been removed/replaced with applicable regulations referred to by the commenter
Aster Global Round 1 Findings (NCR/CL/OFI)	CL: Please clarify in line with the finding and the original comment.
Round 1 Response from Methodology Developer	"An underground water source characterized by a total dissolved solids content greater than 3,000 mg/L, often classified as brackish water, which has higher salinity than freshwater but less than seawater.

Aster Global Round 2 Findings (NCR/CL/OFI)	Text has been updated, with definition moved to the saline aquifer storage module. See public comments for the storage module. Finding is closed.
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Item	118
Comment Number	218
Related Document	Methodology for CCS
Entity	Anew Climate, LLC
Section	4 - Applicability Conditions
Page number	8
Type of Comment	Proposed Change
Comment	Anew suggests adding a comma to make this statement clearer: "Project activities must transport the project CO2 stream to storage sites that are not co located or are not adjoining the capture sites, using an eligible transport activity."
Cluster	D
Response from Methodology Developer	<p>Please refer to response no 20.</p> <p>"The current framework ensures the safe and efficient transport of captured CO2 to eligible storage sites, particularly when these sites are not co-located or directly adjacent to the capture facilities. As detailed in the applicability conditions, project activities must encompass both an eligible capture and storage activity. However, if the storage site is co-located or directly adjacent to the capture site, there is no requirement for a separate transport activity.</p> <p>Text has been revised based on the comment: "Project activities must include at least one eligible capture activity and at least one eligible storage activity. If the project activity is not co-located or not adjoining the capture site, it must use an eligible transport activity. However, in situations where the storage sites are co-located or are adjoining the capture sites, the capture module boundary is directly attached to the storage module boundary, and thus, the project proponent could cover all equipment under one project boundary without defining a separate module boundary for transport."</p>
Aster Global Findings Round 1	<p>The methodology developer has revised the language to make it clear that a transport activity is not required if the capture and storage sites are co-located or are adjoining.</p> <p>After the findings were closed, Verra modified the methodology. These changes were driven by Verra requirements, moving guidance to the modules, updating to the current Verra style guide and to align the methodology to the ICVCM.</p>

Item	119
Comment Number	219
Related Document	Methodology for CCS
Entity	Anew Climate, LLC
Section	4 - Applicability Conditions
Page number	9
Type of Comment	Proposed Change

Comment	<p>Verra's proposed approach is inconsistent with its established deference to the applicable regulatory authorities as it relates to GCS project permitting, development, and MRV.</p> <p>Anew acknowledges that the proposed minimum injectant stream CO2 concentration provides benefits in the form of safeguards against 1) the hazards to materials compatibility and structural integrity posed by certain co-injected chemicals, and 2) adverse impacts to both the environment and the health and safety of relevant stakeholders resulting from the release (intentional or unintentional) of co-injected hazardous or toxic chemicals.</p> <p>However, recognizing that CO2 is, in fact, an acid gas which inherently poses a risk to material compatibility, structural integrity, and consequently, the environment and the health and safety of relevant stakeholders, Anew recommends striking these provisions from the methodology framework. Instead, within the Standard's GCS project requirements, Anew recommends Verra establish requirements for projects to either 1) comply with applicable regulations, or 2) meet a threshold limit for the quantities or concentration of co-injected substances.</p>
Cluster	D
Response from Methodology Developer	<p>Please refer to response no 67.</p> <p>Text has been revised based on the comment:</p> <p>"6. Capture activities must ensure that the CO2 stream delivered to the storage site meets the following requirements:</p> <ul style="list-style-type: none"> o A minimum concentration of 95% purity and o complies with the applicable regulations of the national/regional/local project jurisdiction related to CO2 purity and the concentration of co-injected substances. <p>"</p>
Aster Global Findings Round 1	The methodology developer response and revised text does not addresses the commentors suggestion to remove the minimum concentration of 95% purity from the methodology.
Aster Global Round 1 Findings (NCR/CL/OFI)	CL: Please clarify the response in line with the commentors suggestion.
Round 1 Response from Methodology Developer	Current text do not requires 95% only also local regulation requirements are added. So the conditions of the commentor are defined in the local regulations, it should be still eligible.
Aster Global Round 2 Findings (NCR/CL/OFI)	<p>Text has been updated. Finding is closed.</p> <p>After the findings were closed, Verra modified the methodology. These changes were driven by Verra requirements, moving guidance to the modules, updating to the current Verra style guide and to align the methodology to the ICVCM.</p>

Item	120
Comment Number	220
Related Document	Methodology for CCS
Entity	Anew Climate, LLC
Section	4 - Applicability Conditions
Page number	9

Type of Comment	General Feedback
Comment	Anew suggests adding BiCRS to the eligible capture activities under the BECCS module.
Cluster	D
Response from Methodology Developer	Please refer to response 53. "The BECCS module for power and heat applications are in the public consultation (VMD00XX: Module for CO2 Capture From Bioenergy Combustion). BECCS module for other processes is under development (VMD00XX: Module for CO2 Capture from Bioproduction Processes). So there will be two BECCS module one is for post-combustion the other one is for bioproducts. Question is not relevant to this public consultation."
Aster Global Findings - Round 1	The referenced methodology/module is not yet complete, and future references cannot be assessed. The Assessment team notes that the referenced methodology/module appears to be a reasonable location to address the commentors request.

Item	121
Comment Number	221
Related Document	Methodology for CCS
Entity	Anew Climate, LLC
Section	4 - Applicability Conditions
Page number	9
Type of Comment	General Feedback
Comment	<p>In the event a project utilizes a refrigerant with a GWP greater than 5 that is not controlled under the Montreal Protocol or Kigali Amendment, the project should be eligible provided that the project accounts for refrigerant-related emissions within the quantification of leakage emissions from consumption of materials within the various modules.</p> <p>For conservativeness, these emissions should be determined according to the initial charge size of the industrial refrigeration system and the GWP of the refrigerant contained therein; if the refrigeration system also provides cooling to non-VCS or non-project equipment, the emissions should be allocated to the project based on the ratio of the project's cooling requirements and the system's total cooling capacity. Further, projects should be required to demonstrate the destruction (at an authorized facility) of any refrigerants recovered from the industrial refrigeration systems included in the project.</p>
Cluster	D

Response from Methodology Developer	<p>Please refer to response no 215.</p> <p>" The methodology does specify the need for project facilities that utilize refrigerants to have a GWP below 5. The rationale behind this requirement is to ensure that while capturing and storing CO₂, other potent GHGs are not inadvertently released. However, we understand the variability in regulations across different countries and regions and the importance of proper operation, management, and disposal of refrigerants.</p> <p>Text has been revised based on the comment:</p> <p>7. Where the project facilities include refrigeration systems that utilize industrial refrigerants, they must:</p> <ul style="list-style-type: none"> o Only use refrigerants that are not controlled substances under the Montreal Protocol (e.g., HCFCs) or under the Kigali Amendment (e.g., HFCs); o Ensure that the refrigerants comply with the applicable regulations of the country/region where the equipment is installed. o In cases where the country's regulations are less stringent, a GWP below 5 is recommended. "
Aster Global Findings Round 1	The methodology developers response and revised language does not address the commentors suggestion to include leakage emissions for refrigerants with a GWP greater than 5 that are not controlled under the Montreal protocol or kigali amendment.
Aster Global Round 1 Findings (NCR/CL/OFI)	CL: Please clarify in line with the finding.
Round 1 Response from Methodology Developer	Refrigerants with a GWP higher than 5 is not eligible, therefore if a project developer uses a GWP higher than 5 is not eligible. So no need for adding it as a leakage emission.
Aster Global Round 2 Findings (NCR/CL/OFI)	<p>Text has been updated to provide clear guidance on usage of refrigerants with a GWP greater than 5. Finding is closed.</p> <p>After the findings were closed, Verra modified the methodology. These changes were driven by Verra requirements, moving guidance to the modules, updating to the current Verra style guide and to align the methodology to the ICVCM.</p>

Item	122
Comment Number	222
Related Document	Methodology for CCS
Entity	Anew Climate, LLC
Section	8.3 - Leakage
Page number	21
Type of Comment	Proposed Change
Comment	There appears to be an error in the overarching equation for leakage emissions (8). The term 'PE' in the equation should be 'LE'.
Cluster	G
Response from Methodology Developer	Equation 8 has been revised.
Aster Global Findings Round 1	The development team updated equation (8) in line with the suggestions from the commenter.

Item	123
Comment Number	223

Related Document	Methodology for CCS
Entity	Anew Climate, LLC
Section	7 - Additionality
Page number	17
Type of Comment	General Feedback
Comment	<p>The current methodology for determining common practice presents an unnecessary barrier to implementation since much of the necessary data is not readily available to the public.</p> <p>The common practice should only apply to the project's capture activities, however, for relevant comparison, the test should evaluate common practice within the group of comparable projects which are operational as of the project's planned start date, and also are located in the same country, and have both the same capture and storage activity, as the project's capture activity being evaluated for common practice. Where a project includes storage in active or depleted oil and gas reservoirs, the relevant storage activity for the common practice test should be storage in active or depleted oil and gas reservoirs.</p> <p>Anew suggests that within each source/capture method, Verra specifies acceptable databases to reference for determining the adoption rate, such as the Global CCS Institute, CO2RE Facilities Database.</p>
Cluster	F
Response from Methodology Developer	<p>As described in Step 3, the methodology provides a structured approach to determine if a project is common practice. It specifies criteria such as the percentage of comparable source facilities in the sector and country, the exclusion of similar projects under validation, and the sectors of source facilities. Specifying acceptable databases for determining the adoption rate is noteworthy. While the provided text does not explicitly list databases, it does offer guidance for the common practice assessment in the respective capture modules and The GHG Protocol for Project Accounting, Chapter 7 (WRI-WBCSD).</p>
Aster Global Findings - Round 1	<p>The response is adequate. In addition the methodology developer updated the additionality section, clarifying the options and streamlining the process. No further action is needed at this time. This list of references should be reviewed and updated regularly.</p>

Item	124
Comment Number	224
Related Document	Methodology for CCS
Entity	Anew Climate, LLC
Section	7 - Additionality
Page number	14
Type of Comment	Proposed Change

Comment	<p>RE: Investment analysis requirement 1)</p> <p>Anew supports Verra’s understanding of the need for the investment analysis to be assessed from the perspective of a project’s capture sites. However, while the guidance ensures that developers of vertically integrated projects and projects with diverse ownership apply this same investment analysis boundary, the lack of further guidance here is problematic, for the reasons discussed below. Broadly, Anew recommends revising the requirements as follows:</p> <p>“The assessment must be done from the perspective of the capture activity: -For vertically integrated projects, payments to the operators of transportation or storage must be accounted for internally according to the usage rate of transport and storage by each capture activity. -For vertically integrated projects, costs incurred by the operators of transportation or storage must be accounted for internally according to the usage rate of transport and storage by each capture activity. -Where a project involves diverse ownership, costs may be represented as the real fees to the capture activity from transport and storage site operators.”</p>
Cluster	F
Response from Methodology Developer	<p>The methodology, under Step 2, states that the assessment must be done from the perspective of the capture activity. This ensures a focused and relevant assessment, aligning with the very essence of your recommendation. For vertically integrated projects, the methodology specifies that both capital and operating costs of the transport and storage site(s) must be internally accounted for by the proponent (refer to Step 2, point 1b). This essentially means that the costs related to transportation or storage are already considered, and payments to operators in these areas parts of the value chain are inherently reflected in the overall cost structure. This aligns with the first two points of your recommendation. For projects with diverse operatorships, the methodology acknowledges that costs may manifest as actual fees from transport and storage site operators (Step 2, point 1a). This is in agreement with the third point in your recommendation.</p>
Aster Global Findings Round 1	- The methodology developer updated the additionality section, clarifying the options and streamlining the process. No further action is needed

Item	125
Comment Number	225
Related Document	Methodology for CCS
Entity	Anew Climate, LLC
Section	7 - Additionality
Page number	14
Type of Comment	Proposed Change

Comment	<p>RE: Investment analysis requirement 2)</p> <p>This requirement is confusing for several reasons. Government subsidies are explicitly identified in requirement 8), so Anew interprets this guidance as requiring project developers to account for contract revenues for services rendered by the project and for project- and non-project participants. For example, payments for services (capture and sequestration of VCS and non-VCS CO2) rendered by the project where funds flow:</p> <ul style="list-style-type: none"> -From a CO2 source facility to a capture site owner -From a CO2 source facility to a transportation site owner -From a CO2 source facility to a storage site owner <p>In vertically integrated projects, the above are real revenues to the project participants that should be reflected in the investment analysis. However, the guidance is not sufficiently limited in the case of projects with diverse ownership, since it presumably also applies to payments for services (capture and sequestration of VCS and non-VCS CO2) rendered by the project where funds flow:</p> <ul style="list-style-type: none"> -From a capture site owner to a transportation site owner -From a capture site owner to a storage site owner <p>Anew recommends modifying the language of the requirement to stipulate that for projects with diverse operatorship of transportation and storage infrastructure, the service revenues considered in investment analysis shall be limited to those derived from non-VCS sources (capture sites, governments, etc.).</p>
Cluster	F
Response from Methodology Developer	<p>The methodology in requirement 2) does mention revenues from capture, transport, and storage activities. This includes government subsidies, but the distinction is clarified in requirement 8), which refers explicitly to public support mechanisms and the conditions under which they are considered. The intent is not to be redundant but to ensure all potential revenue streams are considered.</p> <p>As per the methodology, for vertically integrated projects, the proponent must internally account for the capital and operating costs of the transport and storage sites (Step 2, point 1b). The investment analysis effectively captures the revenues and costs of your listed transactions (e.g., from a CO2 source facility to a capture site owner).</p> <p>For projects with diverse operatorships, the methodology notes that costs may be incurred as actual fees from transport and storage site operators (Step 2, point 1a). While your comment suggests further specificity on the direction of fund flows, the methodology intends to ensure that all significant revenues and costs are considered, irrespective of the specific focus of the funds.</p> <p>However, per the current text, the methodology ensures that projects take a comprehensive view of their financial landscape, accounting for all revenues and costs, irrespective of their source or flow direction.</p>
Aster Global Findings Round 1	- The methodology developer updated the additionality section, clarifying the options and streamlining the process. No further action is needed
Item	126
Comment Number	226

Related Document	Methodology for CCS
Entity	Anew Climate, LLC
Section	7 - Additionality
Page number	14
Type of Comment	Proposed Change
Comment	<p>RE: Investment analysis requirement 3)</p> <p>The lack of specificity as to the application of this requirement in the context of a project with diversified operatorship is problematic, for the reasons discussed extensively in the responses to other requirements above (which revenues? Which project configurations? Which expenses?)</p> <p>Anew's recommendation for requirement #1 sufficiently addresses the issues which this requirement creates.</p>
Cluster	F
Response from Methodology Developer	<p>Please refer to responses no 225 and 224.</p> <p>225 - "The methodology in requirement 2) does mention revenues from capture, transport, and storage activities. This includes government subsidies, but the distinction is clarified in requirement 8), which refers explicitly to public support mechanisms and the conditions under which they are considered. The intent is not to be redundant but to ensure all potential revenue streams are considered.</p> <p>As per the methodology, for vertically integrated projects, the proponent must internally account for the capital and operating costs of the transport and storage sites (Step 2, point 1b). The investment analysis effectively captures the revenues and costs of your listed transactions (e.g., from a CO2 source facility to a capture site owner).</p> <p>For projects with diverse operatorships, the methodology notes that costs may be incurred as actual fees from transport and storage site operators (Step 2, point 1a). While your comment suggests further specificity on the direction of fund flows, the methodology intends to ensure that all significant revenues and costs are considered, irrespective of the specific focus of the funds.</p> <p>However, per the current text, the methodology ensures that projects take a comprehensive view of their financial landscape, accounting for all revenues and costs, irrespective of their source or flow direction. "</p> <p>224 - "The methodology, under Step 2, states that the assessment must be done from the perspective of the capture activity. This ensures a focused and relevant assessment, aligning with the very essence of your recommendation. For vertically integrated projects, the methodology specifies that both capital and operating costs of the transport and storage site(s) must be internally accounted for by the proponent (refer to Step 2, point 1b). This essentially means that the costs related to transportation or storage are already considered, and payments to operators in these areas parts of the value chain are inherently reflected in the overall cost structure. This aligns with the first two points of your recommendation. For projects with diverse operatorships, the methodology acknowledges that costs may manifest as actual fees from transport and storage site operators (Step 2, point 1a). This is in agreement with the third point in your recommendation. "</p>
Aster Global Findings Round 1	- The methodology developer updated the additionality section, clarifying the options and streamlining the process. No further action is needed

Item	127
Comment Number	227

Related Document	Methodology for CCS
Entity	Anew Climate, LLC
Section	7 - Additionality
Page number	15
Type of Comment	Proposed Change
Comment	<p>RE: Investment analysis requirement 5)</p> <p>Here, Verra recognizes that developers may undertake projects with a long-dated investment horizon predicated on the activity's growth potential, by making initial investments that exceed the current demand for this infrastructure. However, it is not appropriate to apply a benchmark analysis while also using a rate of return (specified or unspecified) as inputs to the revenue generated by undersubscribed portions of the project infrastructure.</p> <p>Further, this requirement is neither necessary, nor practical to implement in an investment analysis considering projects with diverse operatorship. Viewed from the perspective of a capture site in such a project, an investment analysis would consider project costs those "real fees" incurred by the capture activity.</p> <p>If, as per requirement 1), an investment analysis is to be taken from the perspective of a capture activity, a project capture site paying fees for transportation and/or storage services should not also be required to consider the expected utilization rate, fee structure, and return on investment of those operators' infrastructure. The "real fees" incurred by the capture activity should reflect these factors.</p> <p>Anew recommends limiting this requirement to vertically integrated projects.</p>
Cluster	F
Response from Methodology Developer	<p>The idea reason behind for using the "expected usage rate, fee structure, and return on investment" for parts of the project that aren't fully used yet (as pointed out in requirement 5) is to give a clear picture of the current and expected financial situation. According to CDM Tool 27, this analysis aims to see if an investor would choose a specific project without the extra benefits from the carbon credits. This decision will, therefore, be based on the relevant information available at the time of the investment decision.</p>
Aster Global Findings Round 1	- The methodology developer updated the additionality section, clarifying the options and streamlining the process. No further action is needed

Item	128
Comment Number	228
Related Document	Methodology for CCS
Entity	Anew Climate, LLC
Section	7 - Additionality
Page number	15
Type of Comment	Proposed Change

Comment	<p>RE: Investment analysis requirement 6)</p> <p>As written, the identified example b) describes emission allowances generated by the capture and sequestration of carbon dioxide emissions (“value of emissions allowances granted to the project activity” together with “VCUs may not be issued for the same emission reduction or removal benefit if emissions allowances are also granted”). As stated in the framework methodology, the purposes of the investment analysis is to determine whether the project faces an investment barrier that would prevent the project from being implemented in the absence of carbon credit revenues. As written, the identified example b) as it implies that carbon revenues are, in fact, considered in the investment analysis.</p> <p>Anew supports the completeness of accounting for the financial benefits to any entity which are a result of the project activity. Where the CO2 source facility is regulated, and the project activity reduces that facility’s regulated emissions and causes either a reduction in the facility’s compliance obligations and/or a generation of emissions allowances, the value of these direct benefits should be considered as revenues for the project. This may have been Verra’s intent of this requirement, and if so, Anew recommends striking example for several reasons:</p> <ul style="list-style-type: none"> -VCUs are not stackable with emissions allowances (no double counting). If the project is pursuing VCUs and not pursuing allowances, the project should not have to include expected revenues from emissions allowances in the investment analysis. -It is not reasonable to require revenues from some carbon attributes which are not stackable with VCUs to be included, while not requiring that the project’s capital and operating costs and other revenues be allocated to capture activities according to the usage of the project infrastructure for VCU generation. -A VVB cannot evaluate whether a project’s disclosed forecasted values and quantities of granted emission allowances are reasonable. -Since there are jurisdictional emissions allowance programs which grant allowances to project activities outside of their jurisdictional boundaries (Canadian Clean Fuel Regulations, California LCFS, etc.), a VVB cannot evaluate whether the proponent’s disclosed programs are selected appropriate. Must the proponents use the emissions allowance program with the maximum value which is available to the project at the time? How are the capital and operating costs of
Cluster	F
Response from Methodology Developer	<p>The methodology, particularly in Step 2, point 6b, acknowledges the potential for revenue generation based on the forecasted value of emissions allowances. As per the CDM Tool 01, paragraph 39, the investment analysis mandates that the project proponent include all pertinent costs and revenues. This ensures a comprehensive financial assessment, considering all potential financial avenues, thus upholding the integrity and transparency of the evaluation process.</p>
Aster Global Findings - Round 1	<p>The methodology developer updated the additionality section, clarifying the options and streamlining the process. No further action is needed</p>

Item	129
Comment Number	229
Related Document	Methodology for CCS
Entity	Anew Climate, LLC
Section	7 - Additionality
Page number	15
Type of Comment	Proposed Change

<p>Comment</p>	<p>RE: Investment analysis requirement 7)</p> <p>Anew supports the intent of preventing projects from manipulating the investment analysis by claiming inflated payments to the CO2 source facilities. However, the lack of specificity as to the application of this requirement in the context of a vertically integrated project (where a storage site owner may also be the owner of a capture site) is problematic.</p> <p>Networked projects generally involve some type of bi-directional netback or revenue share agreement with CO2 source facilities for the compliance, VCM, and tax credit value generated by these projects. The above requirement may be misconstrued as being applicable in this situation. In the investment analysis, these sources of revenue must be wholly accounted for as inflows to the project, whereas the payment for netbacks/revenue shares from the project to the CO2 source facility must be wholly excluded. This is not appropriate as this accounting does not represent real cashflows to the project, and thus, the funds available to support the project.</p> <p>For example: where CO2 source facility generates a 45Z credit, the investment analysis would consider both the full value of 45Z credit and the associated netback payment to the project from CO2 source facility as revenues, representing a double accounting of funds. On the other hand, where storage site owner generates a 45Q credit, the investment analysis would consider the full value of 45Q credit as revenue and would not consider the associated netback payment to the CO2 source facility as an expense, representing an incomplete accounting of funds.</p> <p>Anew recommends Verra revise this requirement to preserve the integrity of additionality assessment stemming from the completeness of accounting practices applied in the investment analysis.</p>
<p>Cluster</p>	<p>F</p>
<p>Response from Methodology Developer</p>	<p>The methodology clearly states how the investment analysis should account for costs and revenues. Furthermore, the methodology refers to the CDM tools for clarity. To address the concern about vertically integrated projects, the methodology, as stated under the investment analysis guidelines, emphasizes that for vertically integrated projects, the "capital and operating costs of the transport and storage site(s) must be internally accounted by the proponent" (as seen in requirement 1b). This approach ensures no ambiguity in financial assessments for such projects.</p> <p>Revenues from government subsidies for capture, transport, and storage activities will be integrated into the investment analysis (as detailed in requirement 2). Furthermore, the methodology ensures that any revenue or indirect financial benefit at the CO2 source facilities is accurately accounted for (as highlighted in requirement 6). Thus, the methodology already provides a comprehensive framework to prevent any oversight or miscalculation of funds.</p>
<p>Aster Global Findings Round 1</p>	<p>- The methodology developer updated the additionality section, clarifying the options and streamlining the process. No further action is needed</p>
<p>Item</p>	<p>130</p>
<p>Comment Number</p>	<p>242</p>

Related Document	Methodology for CCS
Entity	Eni SpA
Section	4 - Applicability Conditions
Page number	8
Type of Comment	General Feedback
Comment	Project activities must transport the project CO CO2 stream to storage sites that are not co-located or are not adjoining the capture sites using an eligible transport activity. Please provide a better definition for co-located and adjoining capture and storage sites
Cluster	D
Response from Methodology Developer	<p>Please refer to response no 20.</p> <p>"The current framework ensures the safe and efficient transport of captured CO2 to eligible storage sites, particularly when these sites are not co-located or directly adjacent to the capture facilities. As detailed in the applicability conditions, project activities must encompass both an eligible capture and storage activity. However, if the storage site is co-located or directly adjacent to the capture site, there is no requirement for a separate transport activity.</p> <p>Text has been revised based on the comment: "Project activities must include at least one eligible capture activity and at least one eligible storage activity. If the project activity is not co-located or not adjoining the capture site, it must use an eligible transport activity. However, in situations where the storage sites are co-located or are adjoining the capture sites, the capture module boundary is directly attached to the storage module boundary, and thus, the project proponent could cover all equipment under one project boundary without defining a separate module boundary for transport."</p>
Aster Global Findings Round 1	- The methodology developers revised language does not address the suggestion to add a definition for "co-located".
Aster Global Round 1 Findings (NCR/CL/OFI)	1 CL: Please address the commenters suggestion to add a definition for "co-located"
Round 1 Response from Methodology Developer	Co-located refers to facilities that are situated within a maximum allowable distance from each other that supports direct connectivity and operational integration without the need for extensive transportation infrastructure. An explanation is added to the methodology.
Aster Global Round 2 Findings (NCR/CL/OFI)	2 Text has been updated per the commenters suggestion. Finding is closed. After the findings were closed, Verra modified the methodology. These changes were driven by Verra requirements, moving guidance to the modules, updating to the current Verra style guide and to align the methodology to the ICVCM.

Item	131
Comment Number	243
Related Document	Methodology for CCS
Entity	Eni SpA
Section	7 - Additionality
Page number	
Type of Comment	General Feedback

Comment	In a CCS regulated market like UK, where the policy maker covers all the costs and recognize a margin to the implementer, is the credit generation allowed? Did Verra already considered this cases?
Cluster	F
Response from Methodology Developer	In Step 2, project proponents need to demonstrate an investment barrier, signifying that the project wouldn't be financially viable without the revenues from carbon credits. This step specifies that all forms of revenues, including those from government subsidies, should be incorporated into the investment analysis. If the UK policy covers all costs and provides a margin, such revenues would be considered in this analysis. Thus, the methodology is designed to account for and include such policy-driven financial inflows.
Aster Global Findings Round 1	- The methodology developer updated the additionality section, clarifying the options and streamlining the process. No further action is needed

Item	132
Comment Number	244
Related Document	Methodology for CCS
Entity	Eni SpA
Section	4 - Applicability Conditions
Page number	
Type of Comment	General Feedback
Comment	The methodology states that produce CO2 with the sole purpose to stock it for credit generation is not allowed. What about cases when the CO2 is associated with Natural Gas Production? Is there a threshold limit of CO2 concentration in the Natural Gas that cannot be exceeded
Cluster	D
Response from Methodology Developer	The methodology's intention, especially in the stipulation that projects should not "Produce CO2 to capture it," is to ensure that there's no perverse incentive to produce additional CO2 merely to sequester it and gain credits. This provision is designed to provide that carbon capture and storage (CCS) projects significantly reduce/remove greenhouse gas emissions. The module for capture of CO2 from oil&gas production is currently under development and decisions have not been taken.
Aster Global Findings Round 1	- The referenced methodology/module is not yet complete, and future references cannot be assessed. The Assessment team notes that the referenced methodology/module appears to be a reasonable location to address the commentors question.

Item	133
Comment Number	246
Related Document	Methodology for CCS
Entity	ClimeCo LLC
Section	General
Page number	N/A
Type of Comment	Proposed Change

Comment	Removal and avoidance credits should not be considered under the same methodology. We believe that all removal sections should be introduced in a separate module. Not only do these credit types have very different quantification requirements, the credits themselves are valued differently in the market. These key differences may create confusion among buyers and around the price of each credit.
Cluster	J
Response from Methodology Developer	However, there are project activities, such as cofired bioenergy plants, that achieve both CO2 removals and reductions, necessitating practical reasons for addressing both within the same module in some instances. To mitigate confusion and aid in the clear differentiation between reductions and removals, we are developing the VT00XX: Tool for Differentiating Reductions and Removals in CCS Projects. This tool aims to provide comprehensive guidance on distinguishing between these credit types effectively, tailored specifically for projects where both activities occur. Further details on the tool and its availability will be shared in due course.
Aster Global Findings Round 1	The development teams took due account of the comment by referencing an example where reductions and removals are generated in the same project activity, which would make a separate module impractical. The development team also referenced a tool which will assist project developers in tracking the removals/reductions generated by a CCS project activity.

Item	134
Comment Number	247
Related Document	Methodology for CCS
Entity	ClimeCo LLC
Section	3 - Definitions
Page number	7
Type of Comment	General Feedback
Comment	Based on the definition of point source, would this prohibit the shipping industry from participating? Shipping vessels, although not stationary, are generally considered to be point sources of emissions. Does Verra plan to publish additional guidance around CO2 capture from industries like shipping?
Cluster	C
Response from Methodology Developer	The current framework does not encompass the capture of CO2 on vessels. However, the modular approach of the CCS framework provides flexibility to integrate new project activities by adding supplementary modules by methodology proponents.
Aster Global Findings Round 1	The development team took due account of the comment by clarifying that shipping vessels are currently not covered by the methodology framework. The developers point out that new modules can be added to the framework in the future. The last sentence is a question for Verra so no response is required by the developers.

Item	135
Comment Number	248
Related Document	Methodology for CCS

Entity	ClimeCo LLC
Section	4 - Applicability Conditions
Page number	8
Type of Comment	Proposed Change
Comment	Applicability conditions state that the CO2 stream must be transported and stored at sites the are not co-located or are not adjoining the capture sites – some projects in NA and in the EU have co-located storage sites, does this make those projects ineligible? Define co-loacted
Cluster	D
Response from Methodology Developer	<p>Please refer to response no 20.</p> <p>"The current framework ensures the safe and efficient transport of captured CO2 to eligible storage sites, particularly when these sites are not co-located or directly adjacent to the capture facilities. As detailed in the applicability conditions, project activities must encompass both an eligible capture and storage activity. However, if the storage site is co-located or directly adjacent to the capture site, there is no requirement for a separate transport activity.</p> <p>Text has been revised based on the comment: "Project activities must include at least one eligible capture activity and at least one eligible storage activity. If the project activity is not co-located or not adjoining the capture site, it must use an eligible transport activity. However, in situations where the storage sites are co-located or are adjoining the capture sites, the capture module boundary is directly attached to the storage module boundary, and thus, the project proponent could cover all equipment under one project boundary without defining a separate module boundary for transport."</p>
Aster Global Findings - Round 1	The methodology developers revised language does not address the suggestion to add a definition for "co-located".
Aster Global Round 1 Findings (NCR/CL/OFI)	CL: Please address the commentors suggestion to add a definition for "co-located"
Round 1 Response from Methodology Developer	Co-located refers to facilities that are situated within a maximum allowable distance from each other that supports direct connectivity and operational integration without the need for extensive transportation infrastructure. An explanation is added to the methodology.
Aster Global Round 2 Findings (NCR/CL/OFI)	Text has been updated per the commenters suggestion. Finding is closed. After the findings were closed, Verra modified the methodology. These changes were driven by Verra requirements, moving guidance to the modules, updating to the current Verra style guide and to align the methodology to the ICVCM.

Item	136
Comment Number	249
Related Document	Methodology for CCS
Entity	ClimeCo LLC
Section	7 - Additionality
Page number	14
Type of Comment	Proposed Change

Comment	In response to the 3rd and 4th key questions related to the best approach to assess additionality, we believe that some form of activity penetration would be most applicable. Our suggestion would be to implement a sector penetration rate (ex. 5%) for CCS projects in a sector are not using offsets (already economic). Additionally, we suggest that there be no penetration rate for DAC projects. This technology type relies heavily on external funding, including offsets.
Cluster	F
Response from Methodology Developer	The CDM Tool 24 "Common Practice" also employs a 0.2 (20%) factor to determine common practice. The granularity of our approach ensures the 20% criterion is applied distinctly across sectors and countries. The methodology also does not require common practice analysis for DAC.
Aster Global Findings - Round 1	The methodology developer updated the additionality section, clarifying the options and streamlining the process. No further action is needed

Item	137
Comment Number	250
Related Document	Methodology for CCS
Entity	ReNew
Section	5 - Project Boundary
Page number	10
Type of Comment	Proposed Change
Comment	<p>Clause 5 can be rephrased in below manner to bring in more clarity in project boundary</p> <p>The spatial extent of the project boundary encompasses the physical, geographical site(s) where CO2 generated by any/ any combination/ all the five technologies as mentioned in 'applicability' , is captured by the project, the site(s) where the captured CO2 is processed, the site(s) where the processed CO2 is compressed and dehydrated, the site(s) of the CO2 transport system, the site(s) where CO2 is injected for storage, and the secure underground formation(s) where the injected CO2 is stored.</p>
Cluster	E
Response from Methodology Developer	The current text in the methodology outlines the spatial extent of the project boundary, emphasizing the various sites and areas required for the operation and monitoring of the project. The text also provides a breakdown of the modules for capture, transport, and storage and details the specific elements included within the project boundary.
Aster Global Findings - Round 1	<p>The developer took due account of the proposed change as the current language and figures make it clear that all areas required for operation and monitoring are included in the project boundary.</p> <p>After the findings were closed, Verra modified the methodology. These changes were driven by Verra requirements, moving guidance to the modules, updating to the current Verra style guide and to align the methodology to the ICVCM.</p>

Item	138
Comment Number	251
Related Document	Methodology for CCS
Entity	ReNew

Section	7 - Additionality
Page number	15
Type of Comment	Proposed Change
Comment	Revenue and indirect financial benefits (e.g., savings) at the CO2 source facilities must be accounted . The above should be rephrased as, 'Revenue and indirect financial benefits (e.g., savings) at the CO 2 source facilities, if any, must be accounted .
Cluster	F
Response from Methodology Developer	Please refer to response 227. " The idea reason behind for using the "expected usage rate, fee structure, and return on investment" for parts of the project that aren't fully used yet (as pointed out in requirement 5) is to give a clear picture of the current and expected financial situation. According to CDM Tool 27, this analysis aims to see if an investor would choose a specific project without the extra benefits from the carbon credits. This decision will, therefore, be based on the relevant information available at the time of the investment decision."
Aster Global Findings Round 1	- The methodology developer updated the additionality section, clarifying the options and streamlining the process. No further action is needed

Item	139
Comment Number	252
Related Document	Methodology for CCS
Entity	ReNew
Section	8.1 - Baseline Emissions
Page number	18
Type of Comment	General Feedback
Comment	Fundamentally the baseline equated as stated implies Baseline emissions from the injection of captured CO2 at injection site that would have been emitted to the atmosphere in the absence of the Project in the given year. PI confirm the understanding
Cluster	G
Response from Methodology Developer	Please refer to response no 77. "The methodology defines the baseline scenario in a manner that reflects the absence of the project activity. For CO2 captured from the atmosphere or point sources, it's assumed that in the absence of the project, these emissions would have been released into the atmosphere or would not be captured. By monitoring the mass of injected CO2 as a proxy for baseline emissions and then deducting project and leakage emissions, the methodology provides a straightforward and effective means of calculating net GHG mitigation outcomes. This reflects a pragmatic approach to accounting, where the focus is on the net difference made by the project, thereby simplifying the monitoring and verification process."
Aster Global Findings Round 1	- The development teams response takes due account of the commenters confusion by clearly explaining the rational for the baseline.

Item	140
Comment Number	253
Related Document	Methodology for CCS

Entity	ReNew
Section	8.1.1 - Methods for CO2 Measurement
Page number	18
Type of Comment	General Feedback
Comment	Mass flow rate based CO2 measurement is better for overall process as compared to volumetric method , where $Q_{CO2x} = F_{mass,x} * \%CO2_{mass,x}$. However, volumetric method offers more detailed and accurate measurement process. It is suggested to retain both type of measurement in methodology and allow proponents to choose either of them during project implementation.
Cluster	G
Response from Methodology Developer	The mass flow rate method, expressed as $Q_{CO2} = FR * \%CO2$, directly measures CO2 mass, aligning closely with the primary objectives of CCS projects which focus on the quantification of CO2 in mass terms for accurate greenhouse gas accounting and compliance reporting. This method offers a direct, reliable, and operationally efficient means of measuring CO2, inherently accounting for variations in operational conditions without necessitating complex conversions that could introduce inaccuracies. Conversely, while the volumetric method provides valuable flow characteristics, the assertion that it offers more detailed and accurate measurements is contingent upon precise and consistent density conversions, a factor that can vary significantly under different operational conditions and states of CO2. This could potentially complicate the measurement process and introduce variability in the accuracy of the CO2 mass calculations essential for CCS objectives. Therefore, while acknowledging the specific utilities of both measurement approaches, the methodology's inclusion of both options accommodates the diverse technical and operational contexts of CCS projects, ensuring flexibility. Proponents should be encouraged to select the measurement method that best suits their project's specific requirements, environmental conditions, and regulatory compliance needs.
Aster Global Findings Round 1	The development teams response and the methodology allows the project developer to use volumetric or mass flow rate measurements, as suggested by the commenter.

Item	141
Comment Number	254
Related Document	Methodology for CCS
Entity	ReNew
Section	2 - Summary Description of the Methodology
Page number	6
Type of Comment	General Feedback
Comment	The methodology talks about CCS projects, excluding any possible utilization of CO2 (completely or partially). In case , any project proponent develops a CCUS project, whether the draft methodology would be applicable for project registration/carbon development?
Cluster	D

Response from Methodology Developer	Please refer to response no 136. "The methodology focuses on the capture and subsequent storage of CO2 in geological storage complexes. A methodology for long-term CO2 utilization is currently under development in the CCS+ Initiative. It will be available for public consultation in the future. It will then clarify if and how mixed usage of CO2 is an eligible project activity."
Aster Global Findings - Round 1	The referenced methodology/module is not yet complete, and future references cannot be assessed. The Assessment team notes that the referenced methodology/module appears to be a reasonable location to address the commentors question.

Item	142
Comment Number	255
Related Document	Methodology for CCS
Entity	ReNew
Section	3 - Definitions
Page number	
Type of Comment	General Feedback
Comment	What would be the crediting period for such projects?
Cluster	C
Response from Methodology Developer	The project crediting period is described in the GCS requirements document para 3.3.1.
Aster Global Findings - Round 1	The development team took due account of the comment by pointing out the credit period is published by Verra in the GCS requirement docs (7 years, 5 times renewable).

Item	143
Comment Number	261
Related Document	Methodology for CCS
Entity	Nystart GmbH
Section	4 - Applicability Conditions
Page number	8
Type of Comment	Proposed Change
Comment	Not eligible: Post-combustion capture from power plants, heat generation operations, or Combined Heat and Power (CHP) units based on fossil fuel combustion.
Cluster	D
Response from Methodology Developer	The eligibility of each point source is described under the relevant capture modules.
Aster Global Findings - Round 1	The referenced methodology/module is not yet complete, and future references cannot be assessed. The Assessment team notes that the referenced methodology/module appears to be a reasonable location to address the commentors suggested change.

Item	144
Comment Number	262
Related Document	Methodology for CCS
Entity	Nystart GmbH

Section	4 - Applicability Conditions
Page number	8
Type of Comment	Proposed Change
Comment	Not eligible: Flue gas capture from industrial processes including the chemical industry, mineral production, steel production, cement plants, and hydrogen production.
Cluster	D
Response from Methodology Developer	Please refer to response no 261. "The eligibility of each point source is described under the relevant capture modules. "
Aster Global Findings - Round 1	The referenced methodology/module is not yet complete, and future references cannot be assessed. The Assessment team notes that the referenced methodology/module appears to be a reasonable location to address the commentors suggested change.

Item	145
Comment Number	263
Related Document	Methodology for CCS
Entity	Nystart GmbH
Section	4 - Applicability Conditions
Page number	8
Type of Comment	Proposed Change
Comment	Not eligible: Flue gas capture from oil and gas production and processing including the capture of native CO ₂ , acid gas removal and Liquifid Natural Gas (LNG).
Cluster	D
Response from Methodology Developer	Please refer to response no 261. "The eligibility of each point source is described under the relevant capture modules. "
Aster Global Findings - Round 1	The referenced methodology/module is not yet complete, and future references cannot be assessed. The Assessment team notes that the referenced methodology/module appears to be a reasonable location to address the commentors suggested change.

Item	146
Comment Number	264
Related Document	Methodology for CCS
Entity	Nystart GmbH
Section	5 - Project Boundary
Page number	12
Type of Comment	Proposed Change
Comment	Materiality treshold should be 1%, not 2%.
Cluster	E

Response from Methodology Developer	<p>Please refer to response no 26.</p> <p>"VCS Methodology Requirements v 4.4, particularly paragraph 3.7.3, permits the exclusion of leakage sources deemed de minimis, i.e., insignificant to the overall GHG emission profile of a project. VCS Methodology Requirements also refers to the CDM A/R methodological tool, "Tool for testing significance of GHG emissions in A/R CDM project activities," to determine the significance of the leakage emission source. According to this tool, GHG emission sources may be considered negligible if they account for less than 5% of the total decreases in carbon pools and increases in emissions or less than 5% of net anthropogenic removals by sinks, opting for the lower threshold. In the development of the CCS Methodology, a detailed analysis was undertaken to ensure that emissions from fabrication, construction, disposal, and decommissioning fell below this significance threshold. To adopt a conservative approach and ensure that the methodology remains focused on the most substantial emissions, the de minimis threshold was adjusted from the suggested 5% to a more stringent 2%. This decision was made to prioritize accuracy in GHG accounting while maintaining practicality and feasibility in project implementation and monitoring."</p>
Aster Global Findings Round 1	<p>The developers took due account of the comment and detailed the steps taken to ensure conservativeness by lowering the CDM recommended de minimis threshold from 5% to 2%. The developers also detailed the analysis which excluded the emissions associated with construction/fabrication.</p>

Item	147
Comment Number	265
Related Document	Methodology for CCS
Entity	Nystart GmbH
Section	5 - Project Boundary
Page number	12
Type of Comment	Proposed Change
Comment	Staff commuting should be included, as well as othe rScope 3 emissions. Especially due to the remote location of most storage facilities, the staff commuting can be significant.
Cluster	E

Response from Methodology Developer	<p>Please refer to response no 26.</p> <p>"VCS Methodology Requirements v 4.4, particularly paragraph 3.7.3, permits the exclusion of leakage sources deemed de minimis, i.e., insignificant to the overall GHG emission profile of a project. VCS Methodology Requirements also refers to the CDM A/R methodological tool, "Tool for testing significance of GHG emissions in A/R CDM project activities," to determine the significance of the leakage emission source. According to this tool, GHG emission sources may be considered negligible if they account for less than 5% of the total decreases in carbon pools and increases in emissions or less than 5% of net anthropogenic removals by sinks, opting for the lower threshold. In the development of the CCS Methodology, a detailed analysis was undertaken to ensure that emissions from fabrication, construction, disposal, and decommissioning fell below this significance threshold. To adopt a conservative approach and ensure that the methodology remains focused on the most substantial emissions, the de minimis threshold was adjusted from the suggested 5% to a more stringent 2%. This decision was made to prioritize accuracy in GHG accounting while maintaining practicality and feasibility in project implementation and monitoring."</p>
Aster Global Findings Round 1	It is unclear to the assessment team how the analysis of emission associated fabrication, construction, disposal, and decommissioning address the commentors concern about staff commuting emissions.
Aster Global Round 1 Findings (NCR/CL/OFI)	CL: Please clarify in line with the finding.
Round 1 Response from Methodology Developer	Commuting emissions would likely occur regardless of the project's implementation as staff would otherwise be commuting to different but similarly located employment. Therefore it is excluded.
Aster Global Round 2 Findings (NCR/CL/OFI)	Materiality conditions section has been updated to clear about which leakage sources are to be included in a project. Finding is closed.

Item	148
Comment Number	266
Related Document	Methodology for CCS
Entity	Nystart GmbH
Section	5 - Project Boundary
Page number	12
Type of Comment	Proposed Change
Comment	Direct and indirect land use change as a result of construction and operation of project facilities and equipment should not be excluded.
Cluster	E

Response from Methodology Developer	<p>Please refer to response no 26.</p> <p>"VCS Methodology Requirements v 4.4, particularly paragraph 3.7.3, permits the exclusion of leakage sources deemed de minimis, i.e., insignificant to the overall GHG emission profile of a project. VCS Methodology Requirements also refers to the CDM A/R methodological tool, "Tool for testing significance of GHG emissions in A/R CDM project activities," to determine the significance of the leakage emission source. According to this tool, GHG emission sources may be considered negligible if they account for less than 5% of the total decreases in carbon pools and increases in emissions or less than 5% of net anthropogenic removals by sinks, opting for the lower threshold. In the development of the CCS Methodology, a detailed analysis was undertaken to ensure that emissions from fabrication, construction, disposal, and decommissioning fell below this significance threshold. To adopt a conservative approach and ensure that the methodology remains focused on the most substantial emissions, the de minimis threshold was adjusted from the suggested 5% to a more stringent 2%. This decision was made to prioritize accuracy in GHG accounting while maintaining practicality and feasibility in project implementation and monitoring."</p>
Aster Global Findings Round 1	It is unclear to the assessment team if the analysis of emission associated fabrication, construction, disposal, and decommissioning address the commentors concerns about emissions associated with Land use change as a result of construction and operation of project facilities
Aster Global Round 1 Findings (NCR/CL/OFI)	CL: Please clarify in line with the finding.
Round 1 Response from Methodology Developer	<p>Construction emissions are considered to be minor sources of emissions and are therefore excluded for simplicity in the emissions quantification process. This is also can be checked by the academic papers that discusses the LCA for CO2 capture. Both papers show that total construction emissions are minor.</p> <p>1-Liu, Caroline M.; Sandhu, Navjot K.; McCoy, Sean T.; Bergerson, Joule A. (2020): A life cycle assessment of greenhouse gas emissions from direct air capture and Fischer-Tropsch fuel production, in Sustainable Energy and Fuels, 4(6), p. 3129–3142.</p> <p>2-de Jonge, Melinda M. J.; Daemen, Juul; Loriaux, Jessica M.; Steinmann, Zoran J. N.; Huijbregts, Mark A. J. (2019): Life cycle carbon efficiency of Direct Air Capture systems with strong hydroxide sorbents, in International Journal of Greenhouse Gas Control, 80, p. 25–31.</p>
Aster Global Round 2 Findings (NCR/CL/OFI)	Materiality conditions section has been updated to be clear about which leakage sources are to be included in a project, and justification for not including construction emissions has been provide by the development team. Finding is closed.

Item	149
Comment Number	267
Related Document	Methodology for CCS
Entity	Nystart GmbH
Section	6 - Baseline Scenario
Page number	13
Type of Comment	Proposed Change
Comment	CO2 captured from point source should not be considered eligible

Cluster	E
Response from Methodology Developer	As it currently stands, the methodology has been constructed with a broad spectrum of CO2 emission sources. The rationale behind including CO2 captured from point sources as an eligible baseline scenario is rooted in the principle that this CO2 would otherwise be emitted into the atmosphere without the project activity. Establishing this as a baseline provides a comparative framework against which the benefits of the project activity can be assessed.
Aster Global Findings Round 1	- The methodology developers response points out that the point sources require a different baseline which ensures the project activities will be properly assessed.

Item	150
Comment Number	268
Related Document	Methodology for CCS
Entity	Nystart GmbH
Section	6 - Baseline Scenario
Page number	13
Type of Comment	Proposed Change
Comment	Non-VCS-CO2 should not be deemed eligible.
Cluster	E
Response from Methodology Developer	Non-VCS CO2 is not eligible to generate emission reductions or removals. See also no 69 and no. 70.
Aster Global Findings Round 1	- The methodology developers took due account of the comment, as non-VCS CO2 is not eligible to generate emission reductions

Item	151
Comment Number	269
Related Document	Methodology for CCS
Entity	Nystart GmbH
Section	8.4 - Emission Reductions and Removals
Page number	21
Type of Comment	Proposed Change
Comment	Delete
Cluster	G
Response from Methodology Developer	NA
Aster Global Findings Round 1	- No comment to respond to.

Item	152
Comment Number	270
Related Document	Methodology for CCS
Entity	BMO Radicle
Section	2 - Summary Description of the Methodology
Page number	4
Type of Comment	General Feedback

Comment	Modular approach is a shift from the norm and there are many documents to learn and understand when to use. The benefit of this modular approach is unclear. Personal preference is a one stop protocol approach since I conceptualize the project as one and the one includes capture, transport and storage.
Cluster	K
Response from Methodology Developer	<p>Please refer to response no 47.</p> <p>"The modules' organization is based on the source of emissions and the technology used for capture. Each module explains the scope and applicability of the module however to clarify:</p> <p>Industrial processes vs. Oil/Gas processing: While both are industrial, "industrial processes" refers to emissions from various industrial activities such as cement or steel production. In contrast, "oil/gas processing" targets explicitly oil and gas processing emissions.</p> <p>BECCS have two modules one is for post-combustion the other one is for bioproducts. Given its unique blend of technology and potential for negative emissions, we believe it deserves a dedicated module.</p> <p>Organization by capturing technology: Your suggestion about organizing by capturing technology, like post-combustion or pre-combustion, is valid. Our current approach is designed to align with industry practices and the source of emissions. However, we appreciate your feedback."</p>
Aster Global Findings Round 1	It is unclear to the assessment team how the developers response addresses the commenters concern that a modular approach is not the best path forward for CCS projects.
Aster Global Round 1 Findings (NCR/CL/OFI)	CL: Please clarify in line with the finding
Round 1 Response from Methodology Developer	Methodgy developers believe that modular approach is more userfriendly than the single document since it has a plug and play approach and allow different typesof project is eligible under one framework.
Aster Global Round 2 Findings (NCR/CL/OFI)	Finding is closed.

Item	153
Comment Number	271
Related Document	Methodology for CCS
Entity	BMO Radicle
Section	2 - Summary Description of the Methodology
Page number	5
Type of Comment	General Feedback
Comment	Capture Facility definition - are you saying that there is no capture emissions associated with an ethanol facility? So the fermentation process emissions are not attributed to the CO2? What about emissions to move the CO2 from fermentation to the transportation system
Cluster	C
Response from Methodology Developer	<p>Emissions from the capture process and any associated leakage are detailed in the relevant capture modules for each point source. Each point source type and its specific processes are comprehensively described in its respective module.</p> <p>For queries related to the fermentation process, please note that it is addressed in the VMD00XX: Module for CO2 Capture from Bioproduction Processes. This module will be available for public review and comment in our upcoming release batch.</p>

Aster Global Findings Round 1	The referenced module is not yet complete, and future references cannot be assessed. The Assessment team notes that the referenced module appears to be a reasonable location to address the commenters concern, and that project and leakage emissions will be detailed in each module as the methodology framework text explains.
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Item	154
Comment Number	272
Related Document	Methodology for CCS
Entity	BMO Radicle
Section	2 - Summary Description of the Methodology
Page number	5
Type of Comment	General Feedback
Comment	Where do emissions associated with CO2 conditioning get accounted? Capture module or transport module?
Cluster	E
Response from Methodology Developer	Project emissions are covered in the modules (part of the value chain) where they occur.
Aster Global Findings Round 1	The methodology developers took due account of the comment, by pointing out that emissions associated with CO2 conditioning can be accounted for in either the capture or transport module depending on the project design and where the emissions occur relative to the project boundaries.

Item	155
Comment Number	273
Related Document	Methodology for CCS
Entity	BMO Radicle
Section	2 - Summary Description of the Methodology
Page number	5
Type of Comment	Proposed Change
Comment	Flue Gas definition - flue gas is not always "captured under the CCS project activity". Consider Flue gas definition as the gaseous products released to the atmosphere from the stack of a combustion emission source. Flue gas may or may not be captured in the project activity.
Cluster	C
Response from Methodology Developer	Within the context of the CCS project activity, flue gas refers to CO2 emissions stemming directly from the point source itself or capture activity.
Aster Global Findings Round 1	It is unclear to the assessment team what if any updates were made to the Flue Gas definition based on the commenters suggestion. The assessment team notes that the language "captured under the CCS project activity" is not used in the Flue Gas definition. The assessment team also notes that the developers response of "refers to CO2 emissions stemming directly from the point source itself or capture activity" does not align with the current definition of Flue Gas.
Aster Global Round 1 Findings (NCR/CL/OFI)	CL: Please clarify in line with the finding and the original comment.

Round 1 Response from Methodology Developer	Definition of flue gas has been updated as per the VVB findings after responding the public consultation comments. So definition of the flue gas was changed after our response to the commentor.
Aster Global Round 2 Findings (NCR/CL/OFI)	Text has been updated to provide a clear definition of flue gas. Finding is closed.

Item	156
Comment Number	274
Related Document	Methodology for CCS
Entity	BMO Radicle
Section	2 - Summary Description of the Methodology
Page number	6
Type of Comment	Proposed Change
Comment	Mandatory Monitoring point definition - not only relevant as measurement of the volume of CO2. Presumably some of the monitoring points are for concentration of CO2. revise to include all parameters that need to be measured or delete volume of CO2 and replace with "place to measure the required data parameter".
Cluster	C
Response from Methodology Developer	Text has been revised based on the comment: Mandatory Monitoring Point: The locations where equipment is required to be in place to measure the volume or mass of CO2
Aster Global Findings - Round 1	It is unclear to the assessment team how adding "mass" to the definition adequately addresses the commenters concern about CO2 concentration and other relevant metrics being included in the definition.
Aster Global Round 1 Findings (NCR/CL/OFI)	CL: Please clarify in line with the finding and the original comment.
Round 1 Response from Methodology Developer	Definition is updated to address the comment: A designated location where equipment must be installed to measure specific parameters necessary for calculating the volume or mass of CO2, as outlined in Section 8.1.
Aster Global Round 2 Findings (NCR/CL/OFI)	Text has been updated. Finding is closed. After the findings were closed, Verra modified the methodology. These changes were driven by Verra requirements, moving guidance to the modules, updating to the current Verra style guide and to align the methodology to the ICVCM.

Item	157
Comment Number	275
Related Document	Methodology for CCS
Entity	BMO Radicle
Section	2 - Summary Description of the Methodology
Page number	7
Type of Comment	General Feedback
Comment	definition of Transport of CO2 - earlier transport is described as truck, rail, ship etc. In this definition it says the other mode must be purpose built or dedicated. Does that rule out trucks?
Cluster	C

Response from Methodology Developer	Based on the provided text, transport modes encompass pipelines, ships, rail, and trucks. There is no indication in the provided definition that trucks or any other listed mode of transport would need to be purpose-built or dedicated. Therefore, this definition includes trucks as a valid mode of transport for CO2.
Aster Global Findings Round 1	The developers response of "There is no indication in the provided definition that trucks or any other listed mode of transport would need to be purpose-built or dedicated" contradicts the current definition. It is unclear how the development teams response addresses the commenters confusion about how the purpose built and dedicated terminology relates to trucks, which may be more likely to have multiple uses (i.e. not solely dedicated or purpose built for CO2 transport).
Aster Global Round 1 Findings (NCR/CL/OFI)	CL: Please clarify in line with the finding and the original comment.
Round 1 Response from Methodology Developer	Second part of the definition (which is existing but dedicated to and authorized for the transport of CO2) allows transport modes shared with other purposes)
Aster Global Round 2 Findings (NCR/CL/OFI)	Text has been updated. Finding is closed. After the findings were closed, Verra modified the methodology. These changes were driven by Verra requirements, moving guidance to the modules, updating to the current Verra style guide and to align the methodology to the ICVCM.

Item	158
Comment Number	276
Related Document	Methodology for CCS
Entity	BMO Radicle
Section	2 - Summary Description of the Methodology
Page number	8
Type of Comment	Proposed Change
Comment	define native CO2.
Cluster	C
Response from Methodology Developer	Definition of native CO2 is added.
Aster Global Findings Round 1	The development team updated the methodology by adding a definition for Native CO2 per the commenters suggestion.

Item	159
Comment Number	277
Related Document	Methodology for CCS
Entity	BMO Radicle
Section	2 - Summary Description of the Methodology
Page number	8
Type of Comment	General Feedback
Comment	It is unclear if acid gas injection is eligible when you say acid gas removal, I think on this page you mean CO2 from sour gas processing, right? And the injection in acid gas disposal well - may be covered elsewhere in the documents
Cluster	D

Response from Methodology Developer	Please refer to response no 244. "The methodology's intention, especially in the stipulation that projects should not "Produce CO2 to capture it," is to ensure that there's no perverse incentive to produce additional CO2 merely to sequester it and gain credits. This provision is designed to provide that carbon capture and storage (CCS) projects significantly reduce/remove greenhouse gas emissions. The module for capture of CO2 from oil&gas production is currently under development and decisions have not been taken."
Aster Global Findings Round 1	It is unclear to the assessment team how the response addresses the commenters confusion. Specifically, how the ineligible activity "produce CO2 to capture it" pertains to the commenters confusion about acid gas injection.
Aster Global Round 1 Findings (NCR/CL/OFI)	CL: Please clarify in line with the finding.
Round 1 Response from Methodology Developer	It is a mistake from the methodology developer. Response: The eligibility of each point source is described under the relevant capture modules. Therefore it will be covered and detailed in the oil and gas capture module.
Aster Global Round 2 Findings (NCR/CL/OFI)	See Module for CO2 Capture from Oil and Gas production and Processing public comments for details on the commenters question. Finding is closed.

Item	160
Comment Number	278
Related Document	Methodology for CCS
Entity	BMO Radicle
Section	4 - Applicability Conditions
Page number	8
Type of Comment	Proposed Change
Comment	section 6 projects must adhere to regulations... Consider addressing the situation where no regulations , or very loose regulations exist in a jurisdiction. If there are no rules, you are complying with the regs in your jurisdiction, but are those projects that should go forward? Consider how this situation could affect permanence assurance.
Cluster	D
Response from Methodology Developer	VCS GCS requirements defines the requirements for projects that are hosted in the countries where regulations do not exist.
Aster Global Findings Round 1	The methodology development teams response takes due account of the comment by pointing out that Verra has already published a document that defines requirements for GCS projects as they relate to regulations.

Item	161
Comment Number	279
Related Document	Methodology for CCS
Entity	BMO Radicle
Section	4 - Applicability Conditions
Page number	9
Type of Comment	Proposed Change

Comment	"Reduce energy related emissions from an existing CCS activity, through technology improvement, operational improvement, a shift in the mode of transportation or a switch to less carbon intensive energy sources" What is this trying to accomplish? Is it excluding brownfield, essentially. If yes, then make it more explicit. and what happens to a project that is underway and is using trucks at first due to lack of infrastructure but then when a pipeline becomes available switches. Should that be excluded?
Cluster	D
Response from Methodology Developer	The methodology is not intended to generate emission reductions from increasing the efficiency of existing CCS activities. However, energy savings measures during the operation of a registered project activity will reduce project emissions and will result in higher emission reductions or removals. This is also the case for the mentioned example of the switch from one transportation mode to another
Aster Global Findings Round 1	The development team took due account of the comment by pointing out that the potential situations (switch from trucks to pipeline) is acceptable under the methodology and that energy saving measures will result in lower project emissions.

Item	162
Comment Number	280
Related Document	Methodology for CCS
Entity	BMO Radicle
Section	4 - Applicability Conditions
Page number	9
Type of Comment	General Feedback
Comment	It is unclear why this methodology is limited to CDR (DAC and BECCS). Perhaps it will be come clearer as I progress?
Cluster	D
Response from Methodology Developer	Please refer to response 53. "The BECCS module for power and heat applications are in the public consultation (VMD00XX: Module for CO2 Capture From Bioenergy Combustion). BECCS module for other processes is under development (VMD00XX: Module for CO2 Capture from Bioproduction Processes). So there will be two BECCS module one is for post-combustion the other one is for bioproducts. Question is not relevant to this public consultation."
Aster Global Findings Round 1	The methodology developers response does not address the commenters confusion as to why the methodology is limited to CDR.
Aster Global Round 1 Findings (NCR/CL/OFI)	CL: Please clarify in line with the finding.
Round 1 Response from Methodology Developer	Methodogy is not limited to the CDRs, as it is indicated in the summary of description.

Aster Global Round 2 Findings (NCR/CL/OFI)	Summary text and applicability conditions have been updated to provide clear guidance and differentiation between CDR and reductions for the various modules. Finding is closed. After the findings were closed, Verra modified the methodology. These changes were driven by Verra requirements, moving guidance to the modules, updating to the current Verra style guide and to align the methodology to the ICVCM.
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Item	163
Comment Number	281
Related Document	Methodology for CCS
Entity	BMO Radicle
Section	5 - Project Boundary
Page number	11
Type of Comment	General Feedback
Comment	How are utilities from the primary source represented in the project boundary diagram. Maybe meant to be a CO2 flow diagram and not SSRs, Hopefully, the clarity comes later
Cluster	E
Response from Methodology Developer	Excluded and included project emission sources are defined in each module.
Aster Global Findings - Round 1	The methodology developer took due account of the comment by pointing out that project emissions sources are detailed in each module.

Item	164
Comment Number	282
Related Document	Methodology for CCS
Entity	BMO Radicle
Section	5 - Project Boundary
Page number	11
Type of Comment	Proposed Change
Comment	Figure 1 - consider including a box that shows how "natural" CO2 supply is differentiated. It could be transported in the same pipeline and be delivered for EOR projects https://adv-res.com/pdf/ARI-2021-EOY-2020-CO2-EOR-Survey-OCT-21-2021.pdf . Natural CO2 is not captured from industrial sources. Natural CO2 should not be eligible for credits. However, it should be depicted similar to CO2 utilized at non-VCS facilities an doutside boundary
Cluster	E
Response from Methodology Developer	The capture of native CO2 will be included in the VMD00XX: Module for CO2 Capture from Oil and Gas Production and Processing which will be available for public consultation in later stages.
Aster Global Findings - Round 1	The referenced methodology/module is not yet complete, and future references cannot be assessed. The Assessment team notes that the referenced methodology/module appears to be a reasonable location to address the commentors concern.

Item	165
Comment Number	283

Related Document	Methodology for CCS
Entity	BMO Radicle
Section	6 - Baseline Scenario
Page number	13
Type of Comment	Proposed Change
Comment	Define greenfield and operation start date to be considered greenfield. Does that mean never operated commercially? Never operated as a pilot? Consider the case when a facility has operated for a year or more, but not generated credits or has generated credits under another registry and now wants to switch the project over to CCS+
Cluster	E
Response from Methodology Developer	Please refer to response no 126. "Greenfield and brownfield definitions for source facilities are defined in the respective capture modules. Other modules and tools that cover related CCS activities are under development."
Aster Global Findings - Round 1	The referenced methodology/module is not yet complete, and future references cannot be assessed. The Assessment team notes that the referenced methodology/module appears to be a reasonable location to address the commentors concern.

Item	166
Comment Number	284
Related Document	Methodology for CCS
Entity	BMO Radicle
Section	7 - Additionality
Page number	14
Type of Comment	Proposed Change
Comment	Why is the implementation barrier step 2 limited to investment barrier as the only type of barrier considered? Why not consider technological barriers (infrastructure, technical failure, availability of technology in a region, institutional barriers etc)
Cluster	F
Response from Methodology Developer	Financial feasibility is usually the primary determinant of project implementation. While the methodology specifies "investment barrier" as a primary criterion, it doesn't inherently exclude the consideration of other barriers. The framework allows for an investment analysis that naturally integrates potential technological and institutional barriers because these barriers would directly impact the financial viability of a project. For instance: <ul style="list-style-type: none"> • Technological Barriers: These are implicitly captured through the costs of implementing immature or untested technologies. As per the section "Selection and validation of appropriate benchmark," the expected returns must account for risks associated with investing in immature technologies or those not yet proven in the field. • Infrastructure and technical failures: These factors would inherently influence the capital and operating costs, thus affecting the investment analysis.

Aster Global Findings Round 1	- The methodology developer updated the additionality section, clarifying the options and streamlining the process. No further action is needed. After the findings were closed, Verra modified the methodology. These changes were driven by Verra requirements, moving guidance to the modules, updating to the current Verra style guide and to align the methodology to the ICVCM.
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Item	167
Comment Number	285
Related Document	Methodology for CCS
Entity	BMO Radicle
Section	7 - Additionality
Page number	14
Type of Comment	General Feedback
Comment	How are ITCs and Tax credits and Grants treated in the Investment analysis? All the same or should they be different? Are they included as revenue or deducted from capital costs if grant was received?
Cluster	F
Response from Methodology Developer	Within Step 2, the methodology specifies that funding from governments or other institutions in the form of "grants, tax credits, concessional loans, guarantees, contracts for difference, negative emission payments, or other subsidies" are grouped under the term "public support mechanisms". As per the methodology, such public support mechanisms are to be "reflected as revenues, savings, or in the determination of the benchmark as applicable." For further clarity and guidance on conducting the investment analysis and treating various financial mechanisms, project developers may seek guidance in the referenced CDM Tools: "CDM Tool 01 'Tool for the demonstration and assessment of additionality' and CDM Tool 27 'Investment Analysis'".
Aster Global Findings Round 1	- The methodology developer updated the additionality section, clarifying the options and streamlining the process. No further action is needed

Item	168
Comment Number	286
Related Document	Methodology for CCS
Entity	BMO Radicle
Section	7 - Additionality
Page number	14
Type of Comment	Proposed Change

Comment	Item 4 - requiring all capture activities in a project (for a CCS hub) requires a significant burden on the project developer and also presents concerns of sharing commercially sensitive information amongst competitors. Consider following the decision tree on CDM tool 1 - even if a project is financially attractive, it could still be considered additional if the common practice analysis shows that the activity is not common practice (could set a penetration rate). Until CCS is common practice, these projects should be supported despite financial returns. Suggest removing the investment analysis requirement or allow projects to conservatively say the project is financially attractive but it is additional due to common practice analysis. Suggest adding a decision tree to make the steps more clear. Are steps 1-4 binary and failure to meet any one means not additional? Must the project meet all 3 steps to be additional?
Cluster	F
Response from Methodology Developer	The methodology additionality test is structured sequentially, moving from regulatory surplus to implementation barriers and then to the common practice analysis. It's implied that each step builds upon the previous, and projects must demonstrate compliance with each step to be considered additional. A failure in any step would likely mean the project is not additional per this methodology.
Aster Global Findings - Round 1	The methodology developer updated the additionality section, clarifying the options and streamlining the process. No further action is needed

Item	169
Comment Number	287
Related Document	Methodology for CCS
Entity	BMO Radicle
Section	8.1 - Baseline Emissions
Page number	18
Type of Comment	General Feedback
Comment	Non VCS CO2 injected is better and more flexible in the equation than in figure 1 which labels CO2 captured at nonVCS facilities. Not all Non VCS CO2 injected is "captured" at nonVCS facilities. Maybe Non-VCS CO2 is best in figure 1 to allow for flexibility
Cluster	G
Response from Methodology Developer	Please refer to response no 70. "Please refer to response no 71. "Including non-VCS CO2 streams, especially those utilizing shared CCS hubs where CO2 streams originate from various projects, is a strategic approach that enhances the practicality and scalability of CCS+ framework. Recognizing the potential risks, such as a ton of non-VCS CO2 potentially producing 0.9 ton of CO2 emissions, methodology employs rigorous procedures for monitoring, quantifying, and controlling the entry and influence of non-VCS CO2 streams on project outcomes. The "Tool for Accounting non-VCS CO2 in CCS Projects" establishes detailed criteria and procedures for the quantification and allocation of project emissions (PE _{non-VCS CO2y}) and leakage emissions (LE _{non-VCS CO2y}) for projects where non-VCS CO2 flows through the project boundary. ""

Aster Global Findings Round 1	- It is unclear to the assessment team how the developers response addressed the commenters suggestion to update Figure 1 to be more general in the labeling of non-VCS CO2
Aster Global Round 1 Findings (NCR/CL/OFI)	CL: Please clarify in line with the finding.
Round 1 Response from Methodology Developer	Figure 1 is to illustrate possible CCS hub scenario. More details and figures for non-VCS streams are defined in the non-VCS tool.
Aster Global Round 2 Findings (NCR/CL/OFI)	See public comments on non-vcs tool for further clarifications. Finding is closed.

Item	170
Comment Number	288
Related Document	Methodology for CCS
Entity	MKuijper
Section	4 - Applicability conditions
Page number	8
Type of Comment	Proposed Change
Comment	<p>This suggests that 'native' CO2 is applicable for this methodology and therefore for credits. Native CO2 is CO2 that is taken out of the ground together with the fossil gas (and sometimes with oil). It serves no purpose and needs to be removed so that the fossil gas can meet export specifications. In the past this CO2 used to be vented into the atmosphere. But more and more countries do not allow that anymore. This practice (venting CO2) can be avoided by taxing CO2 emissions (like Norway has done, resulting in CCS projects like Sleipner and Snohvit) or including storage requirements in the production permits (like was done in the Gorgon project in Australia).</p> <p>This methodology is not applicable for project activities that:</p> <ul style="list-style-type: none"> • Produce CO2 for the purpose of capturing it; • Extract CO2 from a geologic formation for the purpose of capturing it; <p>For fields with very high CO2% (which is not uncommon in Asia) the revenues from selling carbon credits could be substantial. Which raises the question of whether the decision to develop such fields is in fact influenced by the prospect of these revenues and therefore it can be argued that the CO2 is produced or extracted with the purpose of capturing it.</p>
Cluster	D
Response from Methodology Developer	<p>Please refer to response no 244.</p> <p>"The methodology's intention, especially in the stipulation that projects should not "Produce CO2 to capture it," is to ensure that there's no perverse incentive to produce additional CO2 merely to sequester it and gain credits. This provision is designed to provide that carbon capture and storage (CCS) projects significantly reduce/remove greenhouse gas emissions. The module for capture of CO2 from oil&gas production is currently under development and decisions have not been taken."</p>
Aster Global Findings Round 1	- The referenced methodology/module is not yet complete, and future references cannot be assessed. The Assessment team notes that the referenced methodology/module appears to be a reasonable location to address the commenters suggested change.

Item	171
Comment Number	289
Related Document	Methodology for CCS
Entity	MKuijper
Section	7 - Additionality
Page number	14
Type of Comment	Proposed Change
Comment	3
Cluster	F
Response from Methodology Developer	
Aster Global Findings Round 1	- Not enough information in the original comment for the developer to respond to.

Item	172
Comment Number	290
Related Document	Methodology for CCS
Entity	Equinor
Section	1 - Sources
Page number	3
Type of Comment	Proposed Change
Comment	I think the following documents should be added: 1) Greenhouse Gas Protocol; Land sector and removals guide, part 1: accounting and reporting requirements and guidance, 2) Information note; Removal activities under Art 6.4 mechanism
Cluster	
Response from Methodology Developer	Sources are revised. In the sources section documents which should be used along with methodology are listed.
Aster Global Findings Round 1	- It is unclear to the assessment team what if any changes to the sources section were made per the commenters suggestion.
Aster Global Round Findings (NCR/CL/OFI)	1 CL: Please clarify in line with the finding.
Round 1 Response from Methodology Developer	Greenhouse Gas Protocol; Land sector and removals guide, part 1: accounting and reporting requirements and guidance is added to the sources.
Aster Global Round Findings (NCR/CL/OFI)	2 Text has been updated. Finding is closed. After the findings were closed, Verra modified the methodology. These changes were driven by Verra requirements, moving guidance to the modules, updating to the current Verra style guide and to align the methodology to the ICVCM.

Item	173
Comment Number	291
Related Document	Methodology for CCS
Entity	Equinor
Section	1 - Sources

Page number	4
Type of Comment	General Feedback
Comment	VMT00XX: GCS Non-Permanence Risk Tool . It is removed from the final version. But it is important to consider. The NPRT is defining the amount of required buffer credits. The current version is very biased towards political/legal/financial aspects and does not sufficiently take into account the geological risk. Future projects in South America or Africa might suffer from it.
Cluster	
Response from Methodology Developer	Sources are revised. In the sources section documents which should be used along with methodology are listed.
Aster Global Findings - Round 1	The development team took due account of the comment by updating the sources section to include the GCS Non-Permanence Risk Tool/

Item	174
Comment Number	292
Related Document	Methodology for CCS
Entity	Equinor
Section	3 - Definitions
Page number	5
Type of Comment	General Feedback
Comment	I speak from a DAC perspective, but I see that many of these definitions are also repeated in the DAC document. In my opinion, one needs to make sure that definitions are the same, for consistency purposes. I believe it is also relevant for other modules.
Cluster	
Response from Methodology Developer	In terms of terminology refinement, the definitions have undergone revisions. We've ensured that these definitions are placed contextually where their relevance is paramount.
Aster Global Findings - Round 1	The development team took due account of the comment by ensuring that repeated definitions are the same if listed in two documents, per the commenters suggestion.

Item	175
Comment Number	293
Related Document	Methodology for CCS
Entity	Equinor
Section	3 - Definitions
Page number	5
Type of Comment	General Feedback
Comment	Is this definition sharp enough?. In the Greenhouse Gas Protocol, Land sector and removals guidance..., p179 talks about "ambient air". Is that a good enough definition?
Cluster	

<p>Response from Methodology Developer</p>	<p>Please refer to response no 51.</p> <p>"Atmospheric CO2 defines CO2 that is present in the atmosphere and is not significantly influenced by any local point source emissions. This distinguishes it from CO2 that might be emitted directly from industrial or other processes.</p> <p>Clarifications:</p> <p>Well-mixed: This term indicates that CO2 is uniformly distributed in the atmosphere and isn't concentrated due to recent emissions from a nearby source.</p> <p>Free atmosphere: This refers to the atmosphere that isn't immediately affected by localized emissions, such as those directly from a chimney.</p> <p>Ambient air temperature: Refers to the natural temperature of the atmosphere, which can vary based on location and time.</p> <p>Sufficiently far enough away from point sources: The intent is to ensure that the captured CO2 isn't directly sourced from a localized emission but rather from the general atmosphere.</p> <p>Text has been revised based on the comment:</p> <p>Based on your feedback, the definition could be revised for clarity as follows:</p> <p>Atmospheric Carbon Dioxide (CO2): Carbon Dioxide (CO2) is a naturally occurring gas and is a by-product of burning fossil fuels and biomass, as well as land-use changes and other industrial processes. It is the principal anthropogenic greenhouse gas that affects the Earth's radiative balance."</p>
<p>Aster Global Findings Round 1</p>	<p>The development team took due account of the comment by updating the definition of Atmospheric Carbon Dioxide.</p> <p>After the findings were closed, Verra modified the methodology. These changes were driven by Verra requirements, moving guidance to the modules, updating to the current Verra style guide and to align the methodology to the ICVCM.</p>

10 APPENDIX D: RESPONSES TO KEY QUESTIONS

Item	1
Comment Number	1
Organization	Devitec-ESG
Key Question	2. Given the high capital cost and long investment horizon of CCS projects, do you think a project approach or standardized approach is more appropriate for assessing additionality? Why?
Comment	The workflows of CCS projects are mostly standard, some level of standardized approach could be applied.
Response from Methodology Developer	We appreciate the suggestion for incorporating a standardized approach given the standard workflows of many CCS projects. While we have chosen the Project Method for its ability to address the complex and variable nature of CCS projects thoroughly, we recognize the potential benefits of integrating standardized elements where appropriate. This could include the use of standardized benchmarks for common project components or criteria for evaluating specific investment barriers. We forwarded your comment to VERRA and where they can continuously evaluate adding the standized apprach in periodic reviews of the methodology
Aster Global Findings Round 1	- The methodology development teams response took due account of the comment by noting the comment for Verra who may incorporate standard approaches in future methodology updates, but notes that in order to properly address the complexity of CCS projects a Project method was selected.

Item	2
Comment Number	2
Organization	Devitec-ESG
Key Question	3. Should a standardized approach using activity penetration be used for assessing additionality for particular project types or capture technologies (such as DAC or other CDR technologies) instead of the project approach using investment analysis? Why or why not?
Comment	For 2023-2040, the market penetration is not expected very high, an upgrade of this condition could be done later.
Response from Methodology Developer	Thank you for endorsing the project-based approach to assessing additionality in Carbon Capture and Storage (CCS). We forwarded your comment to VERRA and where they can continuously evaluate adding the standized apprach in periodic reviews of the methodology
Aster Global Findings Round 1	- The methodology development team chose to use a project-based approach for determining additionality which is in line with the commenters suggestion.

Item	3
Comment Number	3
Organization	Devitec-ESG
Key Question	5. When assessing additionality using activity penetration, how would the maximum adoption potential of DAC facility be measured? What data sources might inform this?

Comment	Most countries have national registries of their oil and gas reservoir or failed drillings, CCS should not be an exception to this as they will follow oil and gas rules for reservoirs and pipelines, this could be the key registry to analyze the market penetration
Response from Methodology Developer	We forwarded your comment to VERRA and where they can continuously evaluate adding the standized apprach in periodic reviews of the methodology
Aster Global Findings Round 1	It is unclear to the assessment team how the developers response adequately addresses the commenters response. The methodology developers revised additionality to use the project method and not a standardized approach. The standardized approach would use activity penetration.
Aster Global Round 1 Findings (NCR/CL/OFI)	CL: Please clarify in line with the finding and the original comment
Round 1 Response from Methodology Developer	The feedback regarding the potential use of a standardized approach for assessing additionality through activity penetration has been noted. However, it's important to emphasize that the current methodology utilizes the project method, not a standardized approach. Therefore, the recommendations regarding data sources and measurement methodologies for activity penetration do not directly align with the existing framework. To ensure comprehensive consideration of stakeholder insights, this comment has been forwarded to VERRA for potential inclusion in future methodology updates. This approach maintains the methodology's relevance and adaptability to evolving industry practices.
Aster Global Round 2 Findings (NCR/CL/OFI)	Finding is closed.

Item	4
Comment Number	4
Organization	Devitec-ESG
Key Question	6. Is a maximum IRR of 21% appropriate for the risk-return profile for CCS technologies in the coming 5-10 years? What alternative maximum IRR would you suggest and why?
Comment	The 21% will be controversial as this is based on a single paper that does not represent Oil & Gas or Energy. The starting point is to differentiate the benchmarking for upstream and downstream business. A gas fired downstream business in power usually operates around 12%, you can confirm this with corporate reports of global operators. The upstream for pipelines and reservoirs must be higher as this has usually higher risks, not less than 18% in OECD countries and you can add country risk to modulate the risk. in general, this analysis is complex and requires a division of the value chain and risks approaches

Response from Methodology Developer	<p>Currently, only 30 capture facilities with a total capture capacity of merely 42.5 million tons per year are currently operational (https://status22.globalccsinstitute.com/wp-content/uploads/2022/11/Global-Status-of-CCS-2022_Download.pdf). Most large-scale CCS projects built over the last decade have been a commercial failure. They are either out of service or significantly performing below expectations. Examples are the Petro Nova project and Boundary Dam project in the US (https://sgp.fas.org/crs/misc/R44902.pdf). Therefore, those projects need to be considered as high risk investment projects similar to venture capital investments. In "How Venture Capital Works" Bob Dizer highlights that the venture capital model is designed to commercialize technologies, some of which might have previously remained dormant in corporations or academia.</p> <p>The methodology uses a comprehensive multi-step approach to assess additionality, including regulatory surplus, implementation barriers, and common practice considerations. The 21% value is explicitly applied when a company has no prior experience undertaking projects with technologies/business models with risks similar to the project activity. It is intended to serve as a proxy for the returns expected when applying the Investment Analysis for the project activity.</p> <p>The choice to use venture capital investments as a reference point stems from the inherently high risks associated with such investments, even if they are undertaken by large energy companies. The document "How Venture Capital Works" presents a range of IRR values over five years, which span from 0% to 50%. This range offers a broad spectrum of potential returns, indicating the variability and uncertainty inherent in the venture capital landscape. 21% fits within this spectrum, closer to the mid-range. The methodology suggests that an IRR benchmark of 21% would be a reasonably robust return, especially considering the higher end of the scale is 50%.</p> <p>Furthermore, the methodology prioritizes using internal company benchmarks/expected returns. These benchmarks reflect risks related to specific project scenarios, such as immature technologies or systems of notable complexity. Such benchmarks are derived from the company's prior investments in activities with similar risks. Hence, the methodology is sensitive to individual projects' specific characteristics and risks.</p>
Aster Global Findings Round 1	<p>The development teams response takes due account of the comment by clearly explaining how and why the 21% IRR value was chosen. The development team also points out that the investment analysis prioritizes using internal company expected returns and only relies on the 21% value when the project developer has no experience in the technologies/business models.</p> <p>After the findings were closed, Verra modified the methodology. These changes were driven by Verra requirements, moving guidance to the modules, updating to the current Verra style guide and to align the methodology to the ICVCM.</p>

Item	5
Comment Number	5
Organization	Devitec-ESG
Key Question	10. What differences in monitoring and long-term risk of reversals exist between storage in saline aquifers and depleted oil and gas reservoirs? Do you think requirements would be different enough to justify having separate modules? Why or why not?

Comment	They are different levels of risk. In a saline aquifer, there was a penetration of seawater into the subsurface due to the higher pressure of salted water that replace clean underground water that was depleted, so there are some interfaces for this penetration of salty water and needs a specific monitoring, the process is slow but it does not take many years. A depleted oil and gas is a different scheme where there is some remaining oil and gas (<20%) and there is enough room to put CO2 or practice EOR. They should be separated modules
Response from Methodology Developer	Thank you for your feedback. An updated storage module that covers both storage options is being developed. VMD00XX: Module for CO2 Storage in Saline Aquifers and Depleted Hydrocarbon Reservoirs
Aster Global Findings Round 1	The referenced module is not yet complete, and future references cannot be assessed. The Assessment team notes that the referenced module appears to be a reasonable location to address the commentors concern.

Item	6
Comment Number	6
Organization	ClonBio Group & Ethanol Europe
Key Question	1. Can emissions reductions and CDR be addressed under a single framework methodology, or should there be a stand-alone framework methodology for removals? Why or why not?
Comment	A separate methodology is preferred. Fermentation CCS is the cheapest option so will progress so it deserves its own simple methodology.
Response from Methodology Developer	Thank you for your valuable feedback emphasizing the need for clear differentiation between emissions reductions and carbon dioxide removals (CDRs), particularly highlighting the role of fermentation CCS. While we are not currently developing a separate methodology exclusively for CDRs, we are committed to addressing the complexities and distinctions between reductions and removals in CCS projects. To this end, we are introducing the VT00XX: Tool for Differentiating Reductions and Removals. This tool is designed to offer detailed guidance, accommodating CCS projects with both reduction and removals of CO2. Your feedback is forwarded to VERRA and CCS+ secretariat for their consideration.
Aster Global Findings Round 1	The development team took due account by developing a specific tool to provide guidance on how project proponents should handle the accounting of reductions and removals. The referenced Tool is not yet complete, and future references cannot be assessed. The Assessment team notes that the referenced tool appears to be a reasonable location to address the commentors suggestion.

Item	7
Comment Number	7
Organization	ClonBio Group & Ethanol Europe
Key Question	2. Given the high capital cost and long investment horizon of CCS projects, do you think a project approach or standardized approach is more appropriate for assessing additionality? Why?
Comment	A standardised approach has the advantage of less administrative burden.

Response from Methodology Developer	<p>Thank you for your feedback on the assessment approach for Carbon Capture and Storage (CCS) projects. We recognize the advantages of a standardized approach, particularly in reducing administrative burdens. However, after careful consideration, we've chosen the Project Method due to the unique complexities of CCS projects:</p> <p>Tailored Evaluations: CCS projects operate in varied regulatory, technological, and market environments, requiring customized assessments to accurately identify additionality.</p> <p>Investment and Technology Considerations: The high capital requirements and diverse technologies across CCS projects necessitate a detailed analysis of financial and technological barriers, which the Project Method provides.</p> <p>Adaptability: The dynamic nature of the CCS sector, with evolving policies and market conditions, calls for an adaptable assessment method like the Project Method to ensure accurate and current evaluations.</p> <p>We forwarded your comment to VERRA and where they can continuously evaluate adding the standized apprach in periodic reviews of the methodology</p>
Aster Global Findings - Round 1	<p>The methodology development teams response took due account of the comment by explaining the rational behind moving forward with the project method for additionality. Specifically, a project method allows for more flexibility to address technology/financial challenges, and will be more adaptable to the varied regulatory landscapes project proponents will face.</p>

Item	8
Comment Number	8
Organization	Carbon Direct Inc.
Key Question	1. Can emissions reductions and CDR be addressed under a single framework methodology, or should there be a stand-alone framework methodology for removals? Why or why not?
Comment	<p>There should be separate frameworks for removals and reductions. Within removals, there should be clear differentiation between atmospheric and biogenic carbon removals.</p> <p>Reduction projects that employ CCS decrease the Scope 1 emissions from a facility. There is significant danger of double-counting when employing the CCS+ methodology on CCS-based reduction projects because any credits that are transacted built upon this methodology must account for all parties' accurate reporting of emissions reductions and offsets and claims to the associated carbon attribute.</p> <p>Removal projects that employ CCS do not depend on an existing facility's Scope 1 emissions. Neither the baseline/counterfactual, nor the facility's documentation of emissions and offsets affect the quality of resultant credits. This is a fundamental difference between reductions and removals that cannot be managed in a single framework.</p>

Response from Methodology Developer	We acknowledge the concerns raised regarding the differentiation between emissions reductions and carbon dioxide removals (CDRs) in CCS projects. In response, we are developing the VT00XX: Tool for Differentiating Reductions and Removals in CCS Projects. This tool is designed to provide clear guidance and procedures for accurately distinguishing between reductions and removals, catering specifically to the diverse nature of CCS projects. It will address the fundamental differences and operational nuances between these two categories, ensuring accurate reporting and prevention of double-counting. Your feedback is forwarded to VERRA and CCS+ secretariat for their consideration.
Aster Global Findings Round 1	The development team took due account by developing a specific tool to provide guidance on how project proponents should handle the accounting of reductions and removals. The referenced Tool is not yet complete, and future references cannot be assessed. The Assessment team notes that the referenced tool appears to be a reasonable location to address the commenters suggestion.

Item	9
Comment Number	9
Organization	Carbon Direct Inc.
Key Question	2. Given the high capital cost and long investment horizon of CCS projects, do you think a project approach or standardized approach is more appropriate for assessing additionality? Why?
Comment	A project-based approach is appropriate for assessing additionality. Projects differ substantially in their applications and targets. However, standards need to be set in place for clear removals to help projects determine and quantify against hard to abate emissions.
Response from Methodology Developer	<p>Thank you for endorsing the project-based approach to assessing additionality in Carbon Capture and Storage (CCS) projects and for emphasizing the importance of establishing clear standards for carbon removals. We recognize the challenges posed by the evolving maturity of CCS technologies. As a response, we are implementing a unified additionality assessment framework applicable across all project types. This ensures a consistent and rigorous evaluation of additionality, even as we navigate the development of these technologies.</p> <p>Additionally, we have forwarded your comments to VERRA for consideration in their future revisions of the additionality guidelines. This may include the development of a positive list to further clarify and support the additionality assessment process for CCS projects.</p>
Aster Global Findings Round 1	The methodology development team chose to use a project-based approach for determining additionality which is in line with the commenters suggestion.

Item	10
Comment Number	10
Organization	Carbon Direct Inc.

Key Question	3. Should a standardized approach using activity penetration be used for assessing additionality for particular project types or capture technologies (such as DAC or other CDR technologies) instead of the project approach using investment analysis? Why or why not?
Comment	<p>Activity penetration should not be used solely to assess additionality on CCS+ projects using the modular methodology. While it is conceivable that, a long time in the future, a material fraction of facilities will adopt CCS and an activity penetration approach may become appropriate, there are many arguments against applying that approach today and in the near future.</p> <p>First of all, the CCS+ modular methodology describes multiple fundamentally different capture approaches. Methods for determining activity penetration will differ between DAC, power, industrial, and biogenic applications (and within biogenic applications such as bio-electricity with CCS vs. capture of CO2 from biological processes such as digestion or fermentation). The exemplar module available for comment here, DAC, does not describe how a user would calculate activity penetration and therefore, this approach cannot be assessed at all.</p> <p>Second, activity penetration cannot be well defined for CCS-based removal approaches such as DAC and BECCS. The “penetration” of DAC is not limited by existing practice. It should be noted that while in the future a large dataset may be available to gauge a project against activity penetration, currently DAC is considered first-of-a-kind (FOAK) and a significant dataset does not exist, nor is it likely to exist in the next 5-10 years. The climate imperative to deploy CDR solutions in the 2030 - 2050 time frame suggests that rapid and profound growth in CDR deployment is not only possible, but likely necessary. Under these assumptions, activity penetration has no meaning. Conversely, applying a standardized approach using activity penetration may help in a specific region, but could ultimately reduce long-term outcomes on a basis of additionality.</p> <p>Finally, market penetration is geographically and resource determined as well as application (e.g., steel vs. natural gas power). Parts of the US have no storage resource - until the transportation infrastructure is built, activity cannot penetrate. Same for Japan & Korea. For DAC, low-C energy resources are also needed. Regions with abundant renewables and limited transmission might get activity but other regions need new transmission, nuclear plants, etc.</p> <p><u>While the concept of CCS+ presented here is admirable, under no circumstances</u></p>
Response from Methodology Developer	Thank you for endorsing the project-based approach to assessing additionality in Carbon Capture and Storage (CCS). We forwarded your comment to VERRA and where they can continuously evaluate adding the standized apprach in periodic reviews of the methodology
Aster Global Findings - Round 1	The methodology development team chose to use a project-based approach for determining additionality which is in line with the commenters suggestion.

Item	11
Comment Number	11
Organization	Carbon Direct Inc.
Key Question	4. When establishing a positive list (activity penetration) for assessing additionality, how would the maximum adoption potential of DAC or other capture technologies be measured? What data sources might inform this?

Comment	Additionality should not be assessed using activity penetration (see Q3). A project approach should be used - each case is specific.
Response from Methodology Developer	Thank you for endorsing the project-based approach to assessing additionality in Carbon Capture and Storage (CCS).
Aster Global Findings Round 1	- The methodology development team chose to use a project-based approach for determining additionality which is in line with the commenters suggestion.

Item	12
Comment Number	12
Organization	Carbon Direct Inc.
Key Question	5. When assessing additionality using activity penetration, how would the maximum adoption potential of DAC facility be measured? What data sources might inform this?
Comment	Additionality should not be assessed using activity penetration (see Q3). A project approach should be used.
Response from Methodology Developer	We forwarded your comment to VERRA and where they can continuously evaluate adding the standized approach in periodic reviews of the methodology
Aster Global Findings Round 1	- The methodology developers revised additionality to use the project method and not a standardized approach. The standardized approach would use activity penetration.

Item	13
Comment Number	13
Organization	Carbon Direct Inc.
Key Question	6. Is a maximum IRR of 21% appropriate for the risk-return profile for CCS technologies in the coming 5-10 years? What alternative maximum IRR would you suggest and why?
Comment	IRR of 18% to 25% is appropriate for the risk-return profile for CCS and hybrid/engineered CDR technologies in the coming 5 - 10 years. In the current economic environment (July 2023), recent global interest rate increases have moved expected rates of return materially upward from where they were over the past 15 years. Furthermore, with the recent increases of WACC a more appropriate "cap" could be an IRR formula including WACC, to prevent projects not progressing because of a too narrow space between the CCS+ IRR cap and the actual WACC.
Response from Methodology Developer	Thank you for endorsing bechnmark value. We forwarded your suggestions to VERRA where they can continuously evaluate adding new approaches in periodic reviews of the methodology
Aster Global Findings Round 1	- The methodology development team chose to use 21% for the IRR which is in line with the commenters suggestion. After the findings were closed, Verra modified the methodology. These changes were driven by Verra requirements, moving guidance to the modules, updating to the current Verra style guide and to align the methodology to the ICVCM.

Item	14
Comment Number	14
Organization	Carbon Direct Inc.

Key Question	7. What types of construction, fabrication or production emissions in DAC projects or other projects may be material to the overall emissions quantification and why?
Comment	<p>An inventory of greenhouse gas emissions, such as that which would be calculated using the GHG Protocol's Project Protocol, should be taken for projects that have major production and fabrication budgets. These include (but are not limited to) DAC plants, and sorbent- and solvent-based power plant and industrial capture facilities. Components whose construction and fabrication might be excluded from the emissions inventory include capture equipment on high-concentration CO2 sources such as those on ethanol, ammonia, and hydrogen plants.</p> <p>The inventory should include emissions from fabrication of capture, transport and storage equipment, including emission factors appropriate to the country of origin for materials of construction. It should include emissions from the manufacture of solvent and/or sorbent, including estimates of total solvent/sorbent consumption and disposal over the project life cycle. It should examine emissions from transport and construction of equipment, and it should exclude those emissions if they are determined to be below the materiality threshold.</p> <p>Specifically for DAC plants that move a lot of air, and for sorbent-based capture projects that need to replace the capture medium regularly, the emissions factors associated with construction and fabrication should be examined on a project basis as these factors may vary by a lot depending on the country of origin and sourcing/disposal requirements. The details of the supply chain for these capture technologies may push the construction/fabrication contributions to gross project emissions well over the materiality threshold, particularly in the near-term before global manufacturing supply chains can be decarbonized.</p> <p>The Climeworks projects in Iceland have included the material, shipping, construction, and labor emissions into their projects. To accomplish 1 ton of removal according to the LCA estimates, the projects must remove ~1.1 tons. This means it is possible to do proper and substantial removals including the material costs, provided the input energy emissions are sufficiently low. Input energy emissions dominate these calculations.</p>
Response from Methodology Developer	Thank you for your feedback. Embodied emissions from energy consumption and material use are included in the quantification procedures.
Aster Global Findings Round 1	The development teams response takes due account of the comment by stating that the suggestion to include embodied emission from energy consumption and material use are included in the quantification procedures, but it is unclear to the assessment team how this response addresses the commenters suggestion that emissions from construction.
Aster Global Round 1 Findings (NCR/CL/OFI)	CL: Please clarify in line with the finding and the original comment

Round 1 Response from Methodology Developer	<p>Materials used in the construction are considered to be minor sources of emissions and are therefore excluded for simplicity in the emissions quantification process. This is also can be checked by the academic papers that discusses the LCA for CO2 capture. Both papers show that construction emissions are minor.</p> <p>1-Liu, Caroline M.; Sandhu, Navjot K.; McCoy, Sean T.; Bergerson, Joule A. (2020): A life cycle assessment of greenhouse gas emissions from direct air capture and Fischer-Tropsch fuel production, in Sustainable Energy and Fuels, 4(6), p. 3129–3142.</p> <p>2-de Jonge, Melinda M. J.; Daemen, Juul; Loriaux, Jessica M.; Steinmann, Zoran J. N.; Huijbregts, Mark A. J. (2019): Life cycle carbon efficiency of Direct Air Capture systems with strong hydroxide sorbents, in International Journal of Greenhouse Gas Control, 80, p. 25–31.</p>
Aster Global Round 2 Findings (NCR/CL/OFI)	Finding is closed.

Item	15
Comment Number	15
Organization	Carbon Direct Inc.
Key Question	8. What risks would purpose-built green PPAs pose to credit integrity? How could these be managed? Are there existing standards, regulations, or other sources that provide guidance related to accounting emission benefits of purpose-built green PPAs?
Comment	Electricity supply agreements range widely in quality from on-site direct-connected renewables, to hourly-matched PPAs, to more general PPAs, to various flavors of RECs. For the purposes of a CCS project adopting a renewable-appropriate EF for electricity, the agreement should specify fully additional renewables electricity supply, evidenced deliverability, and monthly time-matching until 2030. After 2030, for new plants generation and use should be matched hourly or accordingly to prevailing regulations. This is in line with recently endorsed regulated EU rules for other power-using clean energy projects (Green Hydrogen).
Response from Methodology Developer	VERRA published Electricity tool for PPAs. We forwarded your comments to VERRA.
Aster Global Findings Round 1	The question posed by verra relates to a verra published electricity tool for PPAs, the development team took due account of the commenters response by passing the information to Verra.

Item	16
Comment Number	16
Organization	Carbon Direct Inc.
Key Question	9. Is a simplified approach to quantifying small transport emission segments appropriate and why? Are the thresholds and emission intensities proposed appropriate? If not, please explain why and include alternatives with data sources.
Comment	Yes. A simplified approach to quantifying transportation emissions is appropriate, specifically for pipelines.
Response from Methodology Developer	Thank you for endorsing aour approach.

Aster Global Findings Round 1	The methodology development team chose to use a simplified approach to quantifying transportation emissions which is in line with the commenters suggestion.
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Item	17
Comment Number	17
Organization	Carbon Direct Inc.
Key Question	10. What differences in monitoring and long-term risk of reversals exist between storage in saline aquifers and depleted oil and gas reservoirs? Do you think requirements would be different enough to justify having separate modules? Why or why not?
Comment	<p>On the whole, the risks to a well characterized, well operated CO2 storage site are extremely low. This is the basis in the US for focusing on site characterization for the Class VI well permit.</p> <p>Saline aquifers sometimes carry risk of upward migration through fractures created by pressure from CO2 injection or fractures that were not adequately identified in reservoir characterization. These risks are well understood but must and can be managed in design and operation carefully to minimize risk of leakage. There is also risk of leakage if injection wells are not adequately completed and/or not capped/abandoned properly when injection has concluded. These risks are more easily managed through conventional drilling and completion technologies, but again must be specified and managed during the operation. To minimize these risks further, reservoir brine can be produced as a pressure management strategy.</p> <p>Depleted oil and gas reservoirs carry all of these risks (although the risk of unidentified fractures/faults in the reservoir cap is substantially lower, owing to the observed containment of existing hydrocarbon fluids). These reservoirs may also have multiple capped/abandoned wells and lines (from prior hydrocarbon production) that will need further monitoring for pressure and leakage.</p> <p>Therefore, separate methodologies for these two reservoir types are appropriate with special emphasis on pre-existing wells as the greatest potential risk. Also it is important to remember the fact that monitoring of existing wells for both CO2 and hydrocarbon leaks is fundamentally different, and therefore may not be relevant, to storage in saline aquifers.</p> <p>Yes, they will need separate modules, although this depends on the applications. Depleted oil and gas reservoirs may have multiple capped wells and lines that will need further requirements for monitoring (pressure, leakage, etc.).</p>
Response from Methodology Developer	Thank you for your feedback. An updated storage module that covers both storage options is being developed. VMD00XX: Module for CO2 Storage in Saline Aquifers and Depleted Hydrocarbon Reservoirs
Aster Global Findings Round 1	The referenced module is not yet complete, and future references cannot be assessed. The Assessment team notes that the referenced module appears to be a reasonable location to address the commenters concern.

Item	18
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Comment Number	18
Organization	Sascha Bussat
Key Question	1. Can emissions reductions and CDR be addressed under a single framework methodology, or should there be a stand-alone framework methodology for removals? Why or why not?
Comment	<p>So far, there is no technically precise definition of removal/reduction available. The best definition would be: Removal is equal to delayed reduction. (Especially, when considering the high amount of fossil CO2 within the atmosphere)</p> <p>Consequently, reduction and removal should be under the same framework. A better way to distinguish between project would be, to utilize their energy consumption. In the absence of sufficiently available energy, we must focus on the most energy efficient climate action first.</p>
Response from Methodology Developer	In response, we are developing the VT00XX: Tool for Differentiating Reductions and Removals in CCS Projects. This tool is designed to provide clear guidance and procedures for accurately distinguishing between reductions and removals, catering specifically to the diverse nature of CCS projects. It will address the fundamental differences and operational nuances between these two categories, ensuring accurate reporting and prevention of double-counting. Your feedback is forwarded to VERRA and CCS+ secretariat for their consideration.
Aster Global Findings Round 1	The development team took due account by developing a specific tool to provide guidance on how project proponents should handle the accounting of reductions and removals. The referenced Tool is not yet complete, and future references cannot be assessed. The Assessment team notes that the referenced tool appears to be a reasonable location to address the commentors suggestion.

Item	19
Comment Number	19
Organization	Sascha Bussat
Key Question	2. Given the high capital cost and long investment horizon of CCS projects, do you think a project approach or standardized approach is more appropriate for assessing additionality? Why?
Comment	The project approach seems to be more detailed and with respect to the large scale of CCS projects, it does not demonstrate any hurdle.
Response from Methodology Developer	Thank you for endorsing the project-based approach to assessing additionality in Carbon Capture and Storage (CCS)
Aster Global Findings Round 1	The methodology development team chose to use a project-based approach for determining additionality which is in line with the commenters suggestion.

Item	20
Comment Number	20
Organization	Sascha Bussat
Key Question	6. Is a maximum IRR of 21% appropriate for the risk-return profile for CCS technologies in the coming 5-10 years? What alternative maximum IRR would you suggest and why?

Comment	<p>Does the 21% limit for IRR represent a cap for revenues from CCS projects? Should not the free market decide about revenues? Does that maximum reduces funds to go into CCS projects? Suggested limit: 100%</p>
Response from Methodology Developer	<p>1. Does the 21% limit for IRR represent a cap for revenues from CCS projects? No, the 21% IRR is not a cap on revenues. It's a benchmark used in financial additionality assessments to determine if a project would proceed in the absence of carbon financing. It's a measure of the project's financial attractiveness compared to other investments of similar risk.</p> <p>2. Should not the free market decide about revenues?*** While the free market does play a crucial role in determining revenues, the use of a benchmark IRR in the context of carbon credit methodologies is intended to ensure that projects which receive carbon credits are those that would not have been financially viable without this additional carbon income. This ensures that carbon financing is directed toward projects that truly need it to be realized, rather than projects that would proceed anyway.</p> <p>3. Does that maximum reduce funds to go into CCS projects? The benchmark IRR is not about limiting funds but ensuring that carbon credits contribute to projects that genuinely require this financial incentive to overcome barriers to implementation. By demonstrating that a project's financial returns would not meet this benchmark without carbon credit revenues, it helps direct funding to where it can make a real difference in enabling additional CCS activities.</p> <p>4. Suggested limit: 100% Suggesting a limit of 100% would likely make the additionality criterion too lenient, allowing projects that are already financially viable without carbon finance to qualify for carbon credits. This could undermine the integrity of the carbon market by rewarding projects that do not contribute additional greenhouse gas reductions. The goal is to find a balance where the IRR benchmark accurately reflects the risk-adjusted return that investors</p>
Aster Global Findings Round 1	<p>The methodology development team directly responded to each question posed by the commenter and took due account of each one explaining the rationale for why 21% was selected and clarified that there is no cap on revenues. After the findings were closed, Verra modified the methodology. These changes were driven by Verra requirements, moving guidance to the modules, updating to the current Verra style guide and to align the methodology to the ICVCM.</p>

Item	21
Comment Number	21
Organization	Sascha Bussat
Key Question	7. What types of construction, fabrication or production emissions in DAC projects or other projects may be material to the overall emissions quantification and why?

Comment	All project related emissions, including embodied emissions should be taken into account. Especially CCS project require large installations (large CO2 emissions for construction) which should be considered.
Response from Methodology Developer	Thank you for your feedback. Embodied emissions from energy consumption and material use are included in the quantification procedures.
Aster Global Findings - Round 1	The development teams response takes due account of the comment by stating that the suggestion to include embodied emission from energy consumption and material use are included in the quantification procedures, but it is unclear to the assessment team how this response addresses the commenters suggestion that emissions from construction.
Aster Global Round 1 Findings (NCR/CL/OFI)	CL: Please clarify in line with the finding and the original comment
Round 1 Response from Methodology Developer	<p>Please refer to response no 2.</p> <p>"Materials used in the construction are considered to be minor sources of emissions and are therefore excluded for simplicity in the emissions quantification process. This is also can be checked by the academic papers that discusses the LCA for CO2 capture. Both papers show that construction emissions are minor.</p> <p>1-Liu, Caroline M.; Sandhu, Navjot K.; McCoy, Sean T.; Bergerson, Joule A. (2020): A life cycle assessment of greenhouse gas emissions from direct air capture and Fischer-Tropsch fuel production, in Sustainable Energy and Fuels, 4(6), p. 3129–3142.</p> <p>2-de Jonge, Melinda M. J.; Daemen, Juul; Loriaux, Jessica M.; Steinmann, Zoran J. N.; Huijbregts, Mark A. J. (2019): Life cycle carbon efficiency of Direct Air Capture systems with strong hydroxide sorbents, in International Journal of Greenhouse Gas Control, 80, p. 25–31. "</p>
Aster Global Round 2 Findings (NCR/CL/OFI)	Finding is closed.

Item	22
Comment Number	22
Organization	Sascha Bussat
Key Question	10. What differences in monitoring and long-term risk of reversals exist between storage in saline aquifers and depleted oil and gas reservoirs? Do you think requirements would be different enough to justify having separate modules? Why or why not?
Comment	<p>From a subsurface point of view, saline aquifers and depleted oil fields need to be handled in exactly the same way.</p> <p>Therefore, both cases should be combined in one module.</p> <p>Additional modules might be e.g. required for storing CO2 dissolved in water.</p>
Response from Methodology Developer	Thank you for your feedback. An updated storage module that covers both storage options is being developed. VMD00XX: Module for CO2 Storage in Saline Aquifers and Depleted Hydrocarbon Reservoirs
Aster Global Findings - Round 1	The referenced module is not yet complete, and future references cannot be assessed. The Assessment team notes that the referenced module appears to be a reasonable location to address the commentors concern.

Item	23
Comment Number	23

Organization	Orsted
Key Question	1. Can emissions reductions and CDR be addressed under a single framework methodology, or should there be a stand-alone framework methodology for removals? Why or why not?
Comment	<p>We believe that emissions reductions and CDR are fundamentally different products with distinct uses in the VCM. It is crucial to uphold this differentiation between products bfor both buyers and sellers.</p> <p>While certain parts of the framework methodology (for instance steps in the modules for transport and storage on 'Baseline Scenario' and 'Quantification Procedures') were likely to be identical for reductions and removals projects, we find other parts of the methodology must distinguish between the two. For instance, additionality requirements could be stricter for reductions/avoidance projects where a counterfactual baseline scenario is more uncertain or where additionality is otherwise questionable.</p> <p>Instead of combining the two, relevant parts of the framework methodology can just as efficiently be used in a separate emissions reductions framework that limits the risk of confusion between reductions and removals.</p>
Response from Methodology Developer	In response, we are developing the VT00XX: Tool for Differentiating Reductions and Removals in CCS Projects. This tool is designed to provide clear guidance and procedures for accurately distinguishing between reductions and removals, catering specifically to the diverse nature of CCS projects. It will address the fundamental differences and operational nuances between these two categories, ensuring accurate reporting and prevention of double-counting. Your feedback is forwarded to VERRA and CCS+ secretariat for their consideration.
Aster Global Findings Round 1	The development team took due account by developing a specific tool to provide guidance on how project proponents should handle the accounting of reductions and removals. The referenced Tool is not yet complete, and future references cannot be assessed. The Assessment team notes that the referenced tool appears to be a reasonable location to address the commentors suggestion.

Item	24
Comment Number	24
Organization	Orsted
Key Question	2. Given the high capital cost and long investment horizon of CCS projects, do you think a project approach or standardized approach is more appropriate for assessing additionality? Why?

Comment	<p>We believe that the project based approach is most appropriate given the challenges in establishing relevant baselines for the positive list of a standardized approach. The investment analysis supporting a project based approach will have uncertainties that can be addressed through sensitivity analyses in accordance with the CDM tool. While project lifetime and financial characteristics may increase some specific uncertainties for CCS projects, we do not see that the total project risks are higher than other VCM projects, and do not believe that this should deter a project based approach.</p> <p>Given the limited revenue stream for DACCS and other CDR CCS technologies, we suggest that CDM tool option I and II is also considered as appropriate mechanisms to demonstrate financial additionality. The use of these options may more accurately reflect the reality of some projects and may simplify the application of the methodology.</p>
Response from Methodology Developer	Thank you for endorsing the project-based approach to assessing additionality in Carbon Capture and Storage (CCS).
Aster Global Findings Round 1	- The methodology development team chose to use a project-based approach for determining additionality which is in line with the commenters suggestion.

Item	25
Comment Number	25
Organization	Orsted
Key Question	4. When establishing a positive list (activity penetration) for assessing additionality, how would the maximum adoption potential of DAC or other capture technologies be measured? What data sources might inform this?
Comment	We do not believe that a standardized approach is appropriate for the methodology, in part due to significant challenges in defining the relevant market and maximum adoption potential.
Response from Methodology Developer	Thank you for endorsing the project-based approach to assessing additionality in Carbon Capture and Storage (CCS).
Aster Global Findings Round 1	- The methodology development team chose to use a project-based approach for determining additionality which is in line with the commenters suggestion.

Item	26
Comment Number	26
Organization	Orsted
Key Question	5. When assessing additionality using activity penetration, how would the maximum adoption potential of DAC facility be measured? What data sources might inform this?
Comment	We do not believe that a standardized approach is appropriate for the methodology, in part due to significant challenges in defining the relevant market and maximum adoption potential.
Response from Methodology Developer	We forwarded your comment to VERRA and where they can continuously evaluate adding the standardized approach in periodic reviews of the methodology
Aster Global Findings Round 1	- The methodology developers revised additionality to use the project method and not a standardized approach. The standardized approach would use activity penetration.

Item	27
Comment Number	27
Organization	Orsted
Key Question	6. Is a maximum IRR of 21% appropriate for the risk-return profile for CCS technologies in the coming 5-10 years? What alternative maximum IRR would you suggest and why?
Comment	The proposed maximum IRR is overall appropriate. A too low IRR cap may suppress investments in new projects and reduce uptake of CCS countering the purpose of the methodology. Ultimately only the project developer can assess whether the project-specific balance between risk and IRR is investable or not. While IRR of 21% may not be high enough for all markets and all investment cases, we believe that it is high enough to avoid a significant share of projects being stuck between not being investable without VCM and not having access to the VCM.
Response from Methodology Developer	Thank you for endorsing benchmark value.
Aster Global Findings Round 1	The methodology development team chose to use 21% for the IRR which is in line with the commenters suggestion. After the findings were closed, Verra modified the methodology. These changes were driven by Verra requirements, moving guidance to the modules, updating to the current Verra style guide and to align the methodology to the ICVCM.

Item	28
Comment Number	28
Organization	Orsted
Key Question	9. Is a simplified approach to quantifying small transport emission segments appropriate and why? Are the thresholds and emission intensities proposed appropriate? If not, please explain why and include alternatives with data sources.
Comment	Yes, we believe a simplified approach to quantifying small transport segments is appropriate and a sensible trade-off between quantification accuracy and resource-use. Any deviation from the emissions intensities are unlikely to significantly impact the overall project emissions.
Response from Methodology Developer	Thank you for endorsing our approach.
Aster Global Findings Round 1	The methodology development team chose to use a simplified approach to quantifying transportation emissions which is in line with the commenters suggestion.

Item	29
Comment Number	29
Organization	E.ON Energy Projects
Key Question	3. Should a standardized approach using activity penetration be used for assessing additionality for particular project types or capture technologies (such as DAC or other CDR technologies) instead of the project approach using investment analysis? Why or why not?

Comment	<p>The activity penetration should be used on the condition that the definition of penetration rate is well defined and widely recognized and accepted by different entities in the market (e.g., corporates, governments). It also depends on what the threshold value is and how Verra will deal with additionality after the rate is reached.</p> <p>We propose that projects should be allowed to switch to other methods, e.g., project method to continue to demonstrate that the project is additional after the threshold is exceeded.</p>
Response from Methodology Developer	We forwarded your comment to VERRA and where they can continuously evaluate adding the standardized approach in periodic reviews of the methodology
Aster Global Findings - Round 1	The methodology developers revised additionality to use the project method and not a standardized approach. The standardized approach would use activity penetration.

Item	30
Comment Number	30
Organization	E.ON Energy Projects
Key Question	4. When establishing a positive list (activity penetration) for assessing additionality, how would the maximum adoption potential of DAC or other capture technologies be measured? What data sources might inform this?
Comment	It could be measured based on the capture capacity in proportion to the remaining CO2 budget in line with the target of Paris Agreement (1.5 or 2 C)
Response from Methodology Developer	Thank you for your suggestions, We forwarded your comment to VERRA and where they can continuously evaluate adding the standardized approach in periodic reviews of the methodology
Aster Global Findings - Round 1	The methodology developers revised additionality to use the project method and not a standardized approach. The standardized approach would use activity penetration.

Item	31
Comment Number	31
Organization	Velocys PLC
Key Question	1. Can emissions reductions and CDR be addressed under a single framework methodology, or should there be a stand-alone framework methodology for removals? Why or why not?
Comment	In principle, can be addressed under a single framework, but it must recognise the additionality of new projects with negative emissions.
Response from Methodology Developer	Methodology provides a procedure for demonstrating additionality with all eligible project types under the CCS+ methodology framework.
Aster Global Findings - Round 1	The development team took due account of the comment by ensuring additionality requirements adequately describe eligible project types.

Item	32
Comment Number	32
Organization	Velocys PLC

Key Question	2. Given the high capital cost and long investment horizon of CCS projects, do you think a project approach or standardized approach is more appropriate for assessing additionality? Why?
Comment	Project approach. Too much risk with standardised one that a project doesn't quite fit the expected model and therefore rewards are inappropriate.
Response from Methodology Developer	Thank you for endorsing the project-based approach to assessing additionality in Carbon Capture and Storage (CCS)
Aster Global Findings Round 1	- The methodology development team chose to use a project-based approach for determining additionality which is in line with the commenters suggestion.

Item	33
Comment Number	33
Organization	Velocys PLC
Key Question	3. Should a standardized approach using activity penetration be used for assessing additionality for particular project types or capture technologies (such as DAC or other CDR technologies) instead of the project approach using investment analysis? Why or why not?
Comment	Project approach, for the reason above.
Response from Methodology Developer	Thank you for endorsing the project-based approach to assessing additionality in Carbon Capture and Storage (CCS). We forwarded your comment to VERRA and where they can continuously evaluate adding the standardized approach in periodic reviews of the methodology
Aster Global Findings Round 1	- The methodology development team chose to use a project-based approach for determining additionality which is in line with the commenters suggestion.

Item	34
Comment Number	34
Organization	Velocys PLC
Key Question	6. Is a maximum IRR of 21% appropriate for the risk-return profile for CCS technologies in the coming 5-10 years? What alternative maximum IRR would you suggest and why?
Comment	I am struggling to see commercial plants achieving returns as high as this. I would suggest something in the realm of 15%.
Response from Methodology Developer	Thank you for your feedback. We forwarded your suggestions to VERRA where they can continuously evaluate revising the benchmark in periodic reviews of the methodology
Aster Global Findings Round 1	- It is unclear to the assessment team how the development teams response addresses the commenters suggestion that the IRR be ~15% instead of the 21% currently being used.
Aster Global Round Findings (NCR/CL/OFI)	1 CL: Please clarify in line with the finding and the original comment

Round 1 Response from Methodology Developer	<p>The reference for using a 21% Internal Rate of Return (IRR) in the methodology is grounded on industry standards and financial models that reflect the high-risk profile of investments in emerging technologies like CCS. Specifically, this rate is accepted as a proxy for the returns expected from venture capital investments in technologies or business models that share similar risks with the project activities being evaluated. This approach aligns with venture capital practices where a higher IRR is often sought to offset the higher risks associated with pioneering, capital-intensive technologies.</p> <p>The commenter's suggestion of a 15% IRR, while noted, lacks empirical backing or industry reference typical of such methodologies. Therefore, while we recognize the value in reconsidering financial assumptions based on stakeholder feedback, any adjustment to the IRR would require robust supporting data or a shift in industry benchmarks. This comment has been forwarded to VERRA for further review and to ensure that our methodology remains aligned with both industry standards and stakeholder insights.</p>
Aster Global Round 2 Findings (NCR/CL/OFI)	<p>Finding is closed.</p> <p>After the findings were closed, Verra modified the methodology. These changes were driven by Verra requirements, moving guidance to the modules, updating to the current Verra style guide and to align the methodology to the ICVCM.</p>

Item	35
Comment Number	35
Organization	ConocoPhillips
Key Question	1. Can emissions reductions and CDR be addressed under a single framework methodology, or should there be a stand-alone framework methodology for removals? Why or why not?
Comment	Yes, single framework works as the point source is different between a reduction and a removal project. Separate modules adequately address the differences between the projects and the separate tools emphasize these differences.
Response from Methodology Developer	In response, we are developing the VT00XX: Tool for Differentiating Reductions and Removals in CCS Projects. This tool is designed to provide clear guidance and procedures for accurately distinguishing between reductions and removals, catering specifically to the diverse nature of CCS projects. It will address the fundamental differences and operational nuances between these two categories, ensuring accurate reporting and prevention of double-counting. Your feedback is forwarded to VERRA and CCS+ secretariat for their consideration.
Aster Global Findings Round 1	The development team took due account by developing a specific tool to provide guidance on how project proponents should handle the accounting of reductions and removals. The referenced Tool is not yet complete, and future references cannot be assessed. The Assessment team notes that the referenced tool appears to be a reasonable location to address the commentors suggestion.

Item	36
Comment Number	36
Organization	ConocoPhillips

Key Question	2. Given the high capital cost and long investment horizon of CCS projects, do you think a project approach or standardized approach is more appropriate for assessing additionality? Why?
Comment	Project approach is appropriate for initiation, possibly adjusting to a standardized approach over time due to differences in regulation, tax incentives, type of project (point source or DAC) and locations.
Response from Methodology Developer	Thank you for endorsing the project-based approach to assessing additionality in Carbon Capture and Storage (CCS)
Aster Global Findings Round 1	- The methodology development team chose to use a project-based approach for determining additionality which is in line with the commenters suggestion.

Item	37
Comment Number	37
Organization	ConocoPhillips
Key Question	3. Should a standardized approach using activity penetration be used for assessing additionality for particular project types or capture technologies (such as DAC or other CDR technologies) instead of the project approach using investment analysis? Why or why not?
Comment	DAC plants are a unique opportunity to provide long term permanent emission removal and there are no other long term revenue sources to fund the technology other than carbon credits. Until this limited funding changes, we suggest that no activity penetration is set for DAC plants or other CDR technologies.
Response from Methodology Developer	Thank you for endorsing the project-based approach to assessing additionality in Carbon Capture and Storage (CCS). We forwarded your comment to VERRA.
Aster Global Findings Round 1	- The methodology development team chose to use a project-based approach for determining additionality which is in line with the commenters suggestion to not use activity penetration.

Item	38
Comment Number	38
Organization	ConocoPhillips
Key Question	4. When establishing a positive list (activity penetration) for assessing additionality, how would the maximum adoption potential of DAC or other capture technologies be measured? What data sources might inform this?
Comment	DAC plants are a unique opportunity to provide long term permanent emission removal and there are no other long term revenue sources to fund the technology other than carbon credits. Until this limited funding changes, we suggest that no activity penetration is set for DAC plants or other CDR technologies. For point source capture, activity penetration might be more appropriate based on adoption by a percentage of specific industries.
Response from Methodology Developer	Thank you for your suggestions, We forwarded your comment to VERRA and where they can continuously evaluate adding the standized approach in periodic reviews of the methodology
Aster Global Findings Round 1	- The methodology developers revised additionality to use the project method and not a standardized approach. The standardized approach would use activity penetration.

Item	39
Comment Number	39
Organization	ConocoPhillips
Key Question	5. When assessing additionality using activity penetration, how would the maximum adoption potential of DAC facility be measured? What data sources might inform this?
Comment	Assume duplication of question above?
Response from Methodology Developer	NA
Aster Global Findings Round 1	- Comment is unrelated to the question posed by Verra, so no response is required.

Item	40
Comment Number	40
Organization	ConocoPhillips
Key Question	6. Is a maximum IRR of 21% appropriate for the risk-return profile for CCS technologies in the coming 5-10 years? What alternative maximum IRR would you suggest and why?
Comment	IRR seems appropriate for certain types of capture but we suggest a minimum initial 15 year crediting period to be able to prove the technology over a more reasonable time frame and provide assurity to investors. Also, in the case of point source capture where there are multiple parties involved in the overall value chain (capture, transport and sequestration), then information sharing/transparency between parties would be critical to validate the IRR of the overall project. This would be further complicated in the case of a hub that involves multiple emitters and aggregation to a common storage site.
Response from Methodology Developer	Thank you for endorsing benchmark value. We forwarded your suggestions to VERRA
Aster Global Findings Round 1	- It is unclear to the assessment team how the developers response adequately addresses the commenters concern that projects with multiple parties could complicate the IRR of the overall project.
Aster Global Round 1 Findings (NCR/CL/OFI)	1 CL: Please clarify in line with the finding and the original comment
Round 1 Response from Methodology Developer	For CCS hubs, the methodology outlines procedures for integrating operations across multiple emitters and the storage site. This includes guidance on managing shared infrastructure, operational interdependencies, and collective impact on project economics and IRR calculations.
Aster Global Round 2 Findings (NCR/CL/OFI)	2 Finding is closed. After the findings were closed, Verra modified the methodology. These changes were driven by Verra requirements, moving guidance to the modules, updating to the current Verra style guide and to align the methodology to the ICVCM.

Item	41
Comment Number	41
Organization	ConocoPhillips

Key Question	7. What types of construction, fabrication or production emissions in DAC projects or other projects may be material to the overall emissions quantification and why?
Comment	Steel production, fabrication and transportation for DAC capture, transportation and compression equipment.
Response from Methodology Developer	Our analysis shows that those emissions are below 2% materiality threshold, therefore excluded from the quantification procedures.
Aster Global Findings - Round 1	The development teams response takes due account of the comment, by clarifying that these emissions were not included in the methodology because analysis showed they fell below the 2% materiality threshold.

Item	42
Comment Number	42
Organization	ConocoPhillips
Key Question	8. What risks would purpose-built green PPAs pose to credit integrity? How could these be managed? Are there existing standards, regulations, or other sources that provide guidance related to accounting emission benefits of purpose-built green PPAs?
Comment	As long as the renewable facilities are connected to the same power grid, there should be little risk. GHG Protocol for Scope 2 emissions provides a good standard for how these should be accounted for.
Response from Methodology Developer	VERRA published Electricity tool for PPAs. We forwarded your comments to VERRA.
Aster Global Findings - Round 1	The question posed by verra relates to a verra published electricity tool for PPAs, the development team took due account of the commenters response by passing the information to Verra.

Item	43
Comment Number	43
Organization	ConocoPhillips
Key Question	9. Is a simplified approach to quantifying small transport emission segments appropriate and why? Are the thresholds and emission intensities proposed appropriate? If not, please explain why and include alternatives with data sources.
Comment	Agree with the simplified approach. In heavy industrial CCS areas, this may get more complex when there are networks of pipelines that serve multiple emitters and injection wells. Systems should be in place so emissions/leakages are not double counted.
Response from Methodology Developer	Thank you for endorsing our approach.
Aster Global Findings - Round 1	The methodology development team chose to use a simplified approach to quantifying transportation emissions which is in line with the commenters suggestion.

Item	44
Comment Number	44
Organization	ConocoPhillips

Key Question	10. What differences in monitoring and long-term risk of reversals exist between storage in saline aquifers and depleted oil and gas reservoirs? Do you think requirements would be different enough to justify having separate modules? Why or why not?
Comment	This response depends - there are similarities and differences between the approach to saline aquifers and depleted oil & gas reservoirs. Monitoring methods are similar but a key difference is the number of pre-existing wells in depleted reservoirs which could act as leak points if improperly abandoned. Depleted reservoirs have more data and are "proven" to retain fluids underground (based on trapping of hydrocarbons over geologic timeframes) and likely have lower risk of reversals than saline aquifers, outside of pre-existing wells. This may not require 2 modules but perhaps a single module on "storage in geologic reservoirs" that covers the common elements across both and has separate sections to address the differences.
Response from Methodology Developer	Thank you for your feedback. An updated storage module that covers both storage options is being developed. VMD00XX: Module for CO2 Storage in Saline Aquifers and Depleted Hydrocarbon Reservoirs
Aster Global Findings - Round 1	The referenced module is not yet complete, and future references cannot be assessed. The Assessment team notes that the referenced module appears to be a reasonable location to address the commentors concern.

Item	45
Comment Number	45
Organization	Carbonfuture
Key Question	1. Can emissions reductions and CDR be addressed under a single framework methodology, or should there be a stand-alone framework methodology for removals? Why or why not?
Comment	There is no problem addressing both reductions and removals under the same methodology as long as the baseline calculations and quantifications are comprehensive enough to cover both.
Response from Methodology Developer	In response, we are developing the VT00XX: Tool for Differentiating Reductions and Removals in CCS Projects. This tool is designed to provide clear guidance and procedures for accurately distinguishing between reductions and removals, catering specifically to the diverse nature of CCS projects. It will address the fundamental differences and operational nuances between these two categories, ensuring accurate reporting and prevention of double-counting. Your feedback is forwarded to VERRA and CCS+ secretariat for their consideration.
Aster Global Findings - Round 1	The development team took due account by developing a specific tool to provide guidance on how project proponents should handle the accounting of reductions and removals. The referenced Tool is not yet complete, and future references cannot be assessed. The Assessment team notes that the referenced tool appears to be a reasonable location to address the commentors suggestion.

Item	46
Comment Number	46
Organization	Carbonfuture

Key Question	9. Is a simplified approach to quantifying small transport emission segments appropriate and why? Are the thresholds and emission intensities proposed appropriate? If not, please explain why and include alternatives with data sources.
Comment	Using small segments for transport emission quantification is practical for projects with short and diverse modes of transport requirements. For projects with longer and single mode of transport, a longer segment for emission quantification could work better.
Response from Methodology Developer	Thank you for endorsing our approach.
Aster Global Findings - Round 1	The methodology development team chose to use a simplified approach to quantifying transportation emissions which is in line with the commenters suggestion.

Item	47
Comment Number	47
Organization	Carbonfuture
Key Question	10. What differences in monitoring and long-term risk of reversals exist between storage in saline aquifers and depleted oil and gas reservoirs? Do you think requirements would be different enough to justify having separate modules? Why or why not?
Comment	For the sake of applicability, they should be separate. Many projects and companies will steer away from using depleted oil and gas reservoirs, so it would only damage the methodology to keep them combined.
Response from Methodology Developer	Thank you for your feedback. An updated storage module that covers both storage options is being developed. VMD00XX: Module for CO2 Storage in Saline Aquifers and Depleted Hydrocarbon Reservoirs
Aster Global Findings - Round 1	The referenced module is not yet complete, and future references cannot be assessed. The Assessment team notes that the referenced module appears to be a reasonable location to address the commenters concern.

Item	48
Comment Number	48
Organization	Ecoengineers
Key Question	1. Can emissions reductions and CDR be addressed under a single framework methodology, or should there be a stand-alone framework methodology for removals? Why or why not?
Comment	Yes, only requires definitions that define avoidance vs removals for CCS project types. Calculations will be the same.
Response from Methodology Developer	In response, we are developing the VT00XX: Tool for Differentiating Reductions and Removals in CCS Projects. This tool is designed to provide clear guidance and procedures for accurately distinguishing between reductions and removals, catering specifically to the diverse nature of CCS projects. It will address the fundamental differences and operational nuances between these two categories, ensuring accurate reporting and prevention of double-counting. Your feedback is forwarded to VERRA and CCS+ secretariat for their consideration.

Aster Global Findings Round 1	The development team took due account by developing a specific tool to provide guidance on how project proponents should handle the accounting of reductions and removals. The referenced Tool is not yet complete, and future references cannot be assessed. The Assessment team notes that the referenced tool appears to be a reasonable location to address the commentors suggestion.
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Item	49
Comment Number	49
Organization	Ecoengineers
Key Question	2. Given the high capital cost and long investment horizon of CCS projects, do you think a project approach or standardized approach is more appropriate for assessing additionality? Why?
Comment	We recommend that a standardized approach is more appropriate for assessing additionality because of the current novel nature of CCS technologies. We recommend reassessing in approximately 5 years.
Response from Methodology Developer	<p>We've chosen the Project Method due to the unique complexities of CCS projects:</p> <p>Tailored Evaluations: CCS projects operate in varied regulatory, technological, and market environments, requiring customized assessments to accurately identify additionality.</p> <p>Investment and Technology Considerations: The high capital requirements and diverse technologies across CCS projects necessitate a detailed analysis of financial and technological barriers, which the Project Method provides.</p> <p>Adaptability: The dynamic nature of the CCS sector, with evolving policies and market conditions, calls for an adaptable assessment method like the Project Method to ensure accurate and current evaluations.</p> <p>We forwarded your comment to VERRA and where they can continuously evaluate adding the standardized approach in periodic reviews of the methodology</p>
Aster Global Findings Round 1	The methodology development teams response took due account of the comment by explaining the rationale behind moving forward with the project method for additionality. Specifically, a project method allows for more flexibility to address technology/financial challenges, and will be more adaptable to the varied regulatory landscapes project proponents will face.

Item	50
Comment Number	50
Organization	Ecoengineers
Key Question	3. Should a standardized approach using activity penetration be used for assessing additionality for particular project types or capture technologies (such as DAC or other CDR technologies) instead of the project approach using investment analysis? Why or why not?
Comment	We recommend an investment analysis approach be used for assessing additionality so long as there is no carbon stacking (unless projects cannot sustain themselves even with 45Q). Projects should be subjected to practice-based tests.

Response from Methodology Developer	Thank you for endorsing the project-based approach to assessing additionality in Carbon Capture and Storage (CCS). We forwarded your comment to VERRA and where they can continuously evaluate adding the standized apprach in periodic reviews of the methodology
Aster Global Findings Round 1	- The methodology development team chose to use a project-based approach for determining additionality which is in line with the commenters suggestion.

Item	51
Comment Number	51
Organization	Ecoengineers
Key Question	4. When establishing a positive list (activity penetration) for assessing additionality, how would the maximum adoption potential of DAC or other capture technologies be measured? What data sources might inform this?
Comment	We recommend that a positive list should not be established for DAC. There is no participation threshold that will make a DAC project non-eligible for credits with respect to the 1.5°C global temperature goal. (so long as there is no carbon stacking and regulatory mandate).
Response from Methodology Developer	Thank you for endorsing the project-based approach to assessing additionality in Carbon Capture and Storage (CCS).
Aster Global Findings Round 1	- The methodology development team chose to use a project-based approach for determining additionality which is in line with the commenters suggestion.

Item	52
Comment Number	52
Organization	Ecoengineers
Key Question	5. When assessing additionality using activity penetration, how would the maximum adoption potential of DAC facility be measured? What data sources might inform this?
Comment	We recommend not using activity penetration to assess additionality because DAC is the the ideal project type for CDR projects.
Response from Methodology Developer	We forwarded your comment to VERRA and where they can continuously evaluate adding the standized apprach in periodic reviews of the methodology
Aster Global Findings Round 1	- The methodology developers revised additionality to use the project method and not a standardized approach. The standardized approach would use activity penetration.

Item	53
Comment Number	53
Organization	Ecoengineers
Key Question	6. Is a maximum IRR of 21% appropriate for the risk-return profile for CCS technologies in the coming 5-10 years? What alternative maximum IRR would you suggest and why?
Comment	We suggest removing an IRR requirement to prove additionality for the present and reevaluate adding such a requirement in 5 years.
Response from Methodology Developer	Thank you for your feedback. We forwarded your suggestions to VERRA where they can continuously evaluate revising the additionality in periodic reviews of the methodology

Aster Global Findings Round 1	- It is unclear to the assessment team how the development teams response addresses the commenters suggestion to remove the IRR requirement completely.
Aster Global Round 1 Findings (NCR/CL/OFI)	1 CL: Please clarify in line with the finding and the original comment
Round 1 Response from Methodology Developer	Methodology developers added the justification for choosing project method in the annex of the methodology. However, to ensure comprehensive consideration of stakeholder insights, this comment has been forwarded to VERRA for potential future updates in methodology.
Aster Global Round 2 Findings (NCR/CL/OFI)	2 Finding is closed. After the findings were closed, Verra modified the methodology. These changes were driven by Verra requirements, moving guidance to the modules, updating to the current Verra style guide and to align the methodology to the ICVCM.

Item	54
Comment Number	54
Organization	Ecoengineers
Key Question	7. What types of construction, fabrication or production emissions in DAC projects or other projects may be material to the overall emissions quantification and why?
Comment	Project emissions for building DAC facility should be small relative to project emissions resulting from powering DAC. Include anything material to overall removals.
Response from Methodology Developer	Thank you for your feedback and endorsing our approach.
Aster Global Findings Round 1	- The methodology development team chose not to include emissions from construction which is in line with the commenters suggestion.

Item	55
Comment Number	55
Organization	Ecoengineers
Key Question	8. What risks would purpose-built green PPAs pose to credit integrity? How could these be managed? Are there existing standards, regulations, or other sources that provide guidance related to accounting emission benefits of purpose-built green PPAs?
Comment	There might be some limits applied geographical/network requirements, to make sure PPA green plant is in the same network connection (power grid or gas pipeline). Risks could be found in the integrity of the PPA's. In order to overcome this issue in the past only direct connection to the green energy sources were counted, otherwise the prevailing grid factor should be included. In order to allow them, indeed to allow any book and claim kind of approach to energy use one would need some mechanism (perhaps block-chain based) that would reduce uncertainty in the chain of custody of the benefits while simultaneously accounting for market leakage.
Response from Methodology Developer	VERRA published Electricity tool for PPAs. We forwarded your comments to VERRA.

Aster Global Findings Round 1	-	The question posed by verra relates to a verra published electricity tool for PPAs, the development team took due account of the commenters response by passing the information to Verra.
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Item	56	
Comment Number	56	
Organization	Ecoengineers	
Key Question	9. Is a simplified approach to quantifying small transport emission segments appropriate and why? Are the thresholds and emission intensities proposed appropriate? If not, please explain why and include alternatives with data sources.	
Comment	This should be considered inside Project Emissions as it is not difficult to calculate, both when the transportation segment is comprised by pipelines or mobile sources. This could be material if the storage site is far away. Transportation supplier may be able to share information about the volume of fuel or electricity required to transport the CO2 to the storage site.	
Response from Methodology Developer	Thank you for endorsing our approach.	
Aster Global Findings Round 1	-	The methodology development team chose to use a simplified approach to quantifying transportation emissions which is in line with the commenters suggestion.

Item	57	
Comment Number	57	
Organization	Ecoengineers	
Key Question	10. What differences in monitoring and long-term risk of reversals exist between storage in saline aquifers and depleted oil and gas reservoirs? Do you think requirements would be different enough to justify having separate modules? Why or why not?	
Comment	The key variables that dictate the monitoring and risk of reversal, such as injection zone, confining zones, faulting, and artificial penetrations are independent of the fluid in the pore space (saline or hydrocarbon). If everything is equal, then the monitoring plan and the long term risk of reversal would be the same. However, in general, depleted oil and gas fields will be more likely to have a higher number of artificial penetrations. Although this may increase the risk of reversal, the methodology should be no different, and having separate models should not be necessary.	
Response from Methodology Developer	Thank you for your feedback. An updated storage module that covers both storage options is being developed. VMD00XX: Module for CO2 Storage in Saline Aquifers and Depleted Hydrocarbon Reservoirs	
Aster Global Findings Round 1	-	The referenced module is not yet complete, and future references cannot be assessed. The Assessment team notes that the referenced module appears to be a reasonable location to address the commentors concern.

Item	58
Comment Number	58
Organization	Tensora

Key Question	10. What differences in monitoring and long-term risk of reversals exist between storage in saline aquifers and depleted oil and gas reservoirs? Do you think requirements would be different enough to justify having separate modules? Why or why not?
Comment	<p>Yes, the long-term risk of reversals and the mechanisms for reversals is different enough to justify having separate modules. In depleted reservoirs, there are often a large number of legacy wells and perforations in the caprock seal. Furthermore, the extraction of oil, gas and ambient brine causes a change in the effective stress of the formation, which has the potential to reactivate existing faults and create new fluid leakage pathways out of the reservoir.</p> <p>In saline aquifers, there are usually very few legacy wells or perforations in the caprock seal and there has been little to no change in effective stress through fluid extraction. However, the injection of CO2 into saline aquifers will likely require a brine management plan to allow the formation to accommodate the increase in fluid pressure without hydraulically fracturing the caprock seal.</p>
Response from Methodology Developer	Thank you for your feedback. An updated storage module that covers both storage options is being developed. VMD00XX: Module for CO2 Storage in Saline Aquifers and Depleted Hydrocarbon Reservoirs
Aster Global Findings - Round 1	The referenced module is not yet complete, and future references cannot be assessed. The Assessment team notes that the referenced module appears to be a reasonable location to address the commentors concern.

Item	59
Comment Number	59
Organization	Anew Climate, LLC
Key Question	1. Can emissions reductions and CDR be addressed under a single framework methodology, or should there be a stand-alone framework methodology for removals? Why or why not?

<p>Comment</p>	<p>It may not be necessary to address reductions and removals under separate methodology frameworks, and it also may not be a practical approach, since it's not clear how a vertically integrated hub project servicing both reductions-type and removals-type CO2 sources would apply both frameworks. ERs are generated based on the difference between baseline emissions, and project and leakage emissions. Assuming that Verra's quantification modules are wholly inclusive of all emissions, only a project's baseline emissions sources (the project's captured and sequestered CO2) are relevant to the "removal" status of the project's ERs.</p> <p>Anew recommends providing a definition for CDR within the framework methodology (or alternatively, the in-development "VMTOOXX: Tool for Differentiation between Emissions Reductions and Removals in Carbon Capture and Storage Projects") that aligns with this understanding, with an accompanying positive list which identifies the capture activity modules wholly applicable to the following categories: projects which permanently sequester CO2 that is 1) captured directly from the atmosphere, such as DAC, yield CDR quantities equivalent to the project's ERs; 2) captured indirectly from the atmosphere, such as BECCS, yield CDR quantities to equal to or less than the project's ERs; 3) captured during the fossil carbon cycle do not yield CDR. Within the capture modules for those activities in group 2, Verra should exhaustively identify the relevant criteria with which a project must comply to generate removals.</p> <p>Nonetheless, Anew appreciates Verra's recognition that removals- and reductions-based sources have significantly different considerations related to project economics and common practice. Anew requests the methodology framework to provide differentiated guidance to project developers specific to removals- and reductions-based sources each, considering the following:</p> <ul style="list-style-type: none"> - Project Crediting Periods: because of their reliance on VCM financing, CDR projects should have a longer project crediting period than reduction projects. At validation of the initial project design: <ul style="list-style-type: none"> --- Projects generating reductions (wholly or in part) should be granted a first crediting period of 15 years, with additional 10-year crediting periods thrice renewable for a total project crediting period of 45 years maximum.
<p>Response from Methodology Developer</p>	<p>In response to the suggestion for a clear definition of CDR within the framework methodology, we have incorporated specific definitions and categorizations in the "Tool for Differentiating Reductions and Removals in CCS Projects." This tool explicitly defines CDR and establishes criteria for categorizing CO2 capture activities into removals and reductions. It aligns with the understanding that projects capturing CO2 directly from the atmosphere, like DAC, and those capturing CO2 indirectly, such as BECCS, have distinct impacts on CDR quantities. Acknowledging the comment's emphasis on differentiated guidance for removals and reductions, the tool provides specific procedures for calculating and categorizing captured CO2, ensuring that project developers have clear pathways for both types of projects. This includes differentiated crediting periods and additionality assessments tailored to the nature of the project's CO2 source, as highlighted in your feedback.</p> <p>Project crediting period is defined by the VERRA. Your feedback is forwarded to them. Regarding in the additionality Methodology provides a procedure for demonstrating additionality with all eligible project types under the CCS+ methodology framework.</p>

Aster Global Findings Round 1	-	The development team took due account by developing a specific tool to provide guidance on how project proponents should handle the accounting of reductions and removals. The referenced Tool is not yet complete, and future references cannot be assessed. The Assessment team notes that the referenced tool appears to be a reasonable location to address the commentors suggestion. The development team forwarded the crediting period suggestions to VERRA who will determine those guidelines, and wrote the applicability conditions to cover all eligible project activities.
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Item	60	
Comment Number	60	
Organization	Anew Climate, LLC	
Key Question	2. Given the high capital cost and long investment horizon of CCS projects, do you think a project approach or standardized approach is more appropriate for assessing additionality? Why?	
Comment	A project specific assessment of additionality is most appropriate given the overall complexity, capital and operating costs, and investment horizon of CCS projects.	
Response from Methodology Developer	Thank you for endorsing the project-based approach to assessing additionality in Carbon Capture and Storage (CCS)	
Aster Global Findings Round 1	-	The methodology development team chose to use a project-based approach for determining additionality which is in line with the commenters suggestion.

Item	61	
Comment Number	61	
Organization	Anew Climate, LLC	
Key Question	3. Should a standardized approach using activity penetration be used for assessing additionality for particular project types or capture technologies (such as DAC or other CDR technologies) instead of the project approach using investment analysis? Why or why not?	
Comment	Common practice should not be a determining factor for assessing additionality for any removals - by definition, all CDRs should be considered additional, assuming they pass the financial additionality test.	
Response from Methodology Developer	The common practice test evaluates the proportion of projects that are registered within the Voluntary Carbon Market (VCM) versus those that are not. As such, it serves as an important safeguard for the financial additionality test. This is because a higher number of non-registered projects indicates that CCS projects might not require additional financial incentives to be viable. This mechanism ensures that only projects genuinely in need of support to overcome financial barriers are considered additional, maintaining the integrity of investments in the carbon market.	
Aster Global Findings Round 1	-	The methodology development teams response took due account of the comment by explaining the rational behind moving forward with the project method for additionality. Specifically, the common practice test, which helps ensure investments in the carbon market are allocated to projects which require financial incentives.

Item	62
Comment Number	62

Organization	Anew Climate, LLC
Key Question	4. When establishing a positive list (activity penetration) for assessing additionality, how would the maximum adoption potential of DAC or other capture technologies be measured? What data sources might inform this?
Comment	<p>The CCS+ framework is not well suited for a positive-list of uncommon practices, as projects may have various capture and storage activities. Hence, Anew recommends including further guidance related to this area:</p> <p>The common practice should only apply to the project's capture activities, however, for relevant comparison, the test should evaluate common practice within the group of comparable projects which are operational as of the project's planned start date, and also are located in the same country, and have both the same capture and storage activity, as the project's capture activity being evaluated for common practice. Where a project includes storage in active or depleted oil and gas reservoirs, the relevant storage activity for the common practice test should be storage in active or depleted oil and gas reservoirs.</p>
Response from Methodology Developer	We forwarded your comment to VERRA and where they can continuously evaluate adding the standized approach in periodic reviews of the methodology
Aster Global Findings Round 1	The methodology developers revised additionality to use the project method and not a standardized approach. The standardized approach would use activity penetration.

Item	63
Comment Number	63
Organization	Anew Climate, LLC
Key Question	5. When assessing additionality using activity penetration, how would the maximum adoption potential of DAC facility be measured? What data sources might inform this?
Comment	Activities generating removals should not be subject to the common practice test.
Response from Methodology Developer	We forwarded your comment to VERRA and where they can continuously evaluate adding the standized approach in periodic reviews of the methodology
Aster Global Findings Round 1	The methodology developers revised additionality to use the project method and not a standardized approach. The standardized approach would use activity penetration.

Item	64
Comment Number	64
Organization	Anew Climate, LLC
Key Question	6. Is a maximum IRR of 21% appropriate for the risk-return profile for CCS technologies in the coming 5-10 years? What alternative maximum IRR would you suggest and why?

Comment	<p>For all CCS projects (reduction and removal), a crediting period of 7 years will not incentivize development of capital considering the necessary investment levels and risk. Because of their reliance on VCM financing, CDR projects should have a longer project crediting period than reduction projects. At validation of the initial project design:</p> <p>--- Projects generating reductions (wholly or in part) should be granted a first crediting period of 15 years, with additional 10-year crediting periods thrice renewable for a total project crediting period of 45 years maximum.</p> <p>--- Projects generating only removals may elect to choose to be granted either A) the above crediting period structure (15+10+10+10), or B) a first crediting period of 25 years, with additional 10 year crediting periods twice renewable for a total project crediting period of 45 years maximum. If such a project is modified to include a reductions-based source within 15 years of the start date of the project's first crediting period, the project must revert to an initial crediting period of 15 years (beginning at the same crediting period start date), with additional 10-year crediting periods thrice renewable for a total project crediting period of 45 years maximum.</p> <p>--- Recognizing that a lack of access to VCM revenue risks "orphaning" project capture sites following the conclusion of their 45 year crediting period, projects should be eligible for registration again. However, these projects should be required to do so from a "clean slate", demonstrating the additionality and validity of the project's baselines using the guidance below. In addition to the related guidance currently included in the framework methodology, the investment analysis must not include any capital costs for any portion of project infrastructure incurred prior to the conclusion of the previously registered project's crediting period, and may include the costs of servicing residual debt incurred for the acquisition or development of eligible project capture sites and/or shared project infrastructure.</p>
Response from Methodology Developer	Thank you for your feedback. We forwarded your suggestions to VERRA where they can continuously evaluate revising the additionality in periodic reviews of the methodology
Aster Global Findings - Round 1	<p>The determination of crediting periods is not controlled by the methodology development team, and the comment was forwarded to Verra for their consideration.</p> <p>After the findings were closed, Verra modified the methodology. These changes were driven by Verra requirements, moving guidance to the modules, updating to the current Verra style guide and to align the methodology to the ICVCM.</p>

Item	65
Comment Number	65
Organization	Anew Climate, LLC
Key Question	7. What types of construction, fabrication or production emissions in DAC projects or other projects may be material to the overall emissions quantification and why?
Comment	Embodied carbon should be amortized over the lesser of either the planned lifetime of the project, or the project's maximum allowable crediting period.

Response from Methodology Developer	Thank you for your feedback however construction emissions are not included in the quantification. We forwarded your comment to VERRA where they can continuously evaluate the included emission sources.
Aster Global Findings Round 1	It is unclear to the assessment team how the methodology developers response addresses the commenters suggestion that embodied carbon be amortized over the planned life of the project, or the crediting period.
Aster Global Round 1 Findings (NCR/CL/OFI)	CL: Please clarify in line with the finding and the original comment
Round 1 Response from Methodology Developer	<p>Please refer to response no 2.</p> <p>"Materials used in the construction are considered to be minor sources of emissions and are therefore excluded for simplicity in the emissions quantification process. This is also can be checked by the academic papers that discusses the LCA for CO2 capture. Both papers show that construction emissions are minor.</p> <p>1-Liu, Caroline M.; Sandhu, Navjot K.; McCoy, Sean T.; Bergerson, Joule A. (2020): A life cycle assessment of greenhouse gas emissions from direct air capture and Fischer-Tropsch fuel production, in Sustainable Energy and Fuels, 4(6), p. 3129–3142.</p> <p>2-de Jonge, Melinda M. J.; Daemen, Juul; Loriaux, Jessica M.; Steinmann, Zoran J. N.; Huijbregts, Mark A. J. (2019): Life cycle carbon efficiency of Direct Air Capture systems with strong hydroxide sorbents, in International Journal of Greenhouse Gas Control, 80, p. 25–31. "</p>
Aster Global Round 2 Findings (NCR/CL/OFI)	Finding is closed.

Item	66
Comment Number	66
Organization	Anew Climate, LLC
Key Question	8. What risks would purpose-built green PPAs pose to credit integrity? How could these be managed? Are there existing standards, regulations, or other sources that provide guidance related to accounting emission benefits of purpose-built green PPAs?
Comment	<p>There may be integrity risks if the framework methodology does not include:</p> <p>1) requirements for proponents to demonstrate clear and uncontested ownership, and the corresponding retirement, for all RECs/EACs generated from quantities of renewable energy produced by the generation facility and also consumed by the project (no double counting); and</p> <p>2) requirements for projects to determine the lifecycle CI of the generation facilities and apply this emissions factor to the quantities consumed (completeness of GHG accounting).</p> <p>Only the former appears lacking from the current framework methodology and quantification modules</p>
Response from Methodology Developer	VERRA published Electricity tool for PPAs. We forwarded your comments to VERRA.
Aster Global Findings Round 1	The question posed by verra relates to a verra published electricity tool for PPAs, the development team took due account of the commenters response by passing the information to Verra.

Item	67
Comment Number	67
Organization	Anew Climate, LLC
Key Question	9. Is a simplified approach to quantifying small transport emission segments appropriate and why? Are the thresholds and emission intensities proposed appropriate? If not, please explain why and include alternatives with data sources.
Comment	
Response from Methodology Developer	
Aster Global Findings - Round 1	No comment for the methodology development team to respond to.

Item	68
Comment Number	68
Organization	Anew Climate, LLC
Key Question	10. What differences in monitoring and long-term risk of reversals exist between storage in saline aquifers and depleted oil and gas reservoirs? Do you think requirements would be different enough to justify having separate modules? Why or why not?
Comment	There should be separate storage modules for saline aquifers and depleted oil and gas reservoirs to address the risk of reversal from legacy wells depending on various factors such as location (onshore/offshore), age of wells, etc.
Response from Methodology Developer	Thank you for your feedback. An updated storage module that covers both storage options is being developed. VMD00XX: Module for CO2 Storage in Saline Aquifers and Depleted Hydrocarbon Reservoirs
Aster Global Findings - Round 1	The referenced module is not yet complete, and future references cannot be assessed. The Assessment team notes that the referenced module appears to be a reasonable location to address the commentors concern.

Item	69
Comment Number	69
Organization	Eni SpA
Key Question	1. Can emissions reductions and CDR be addressed under a single framework methodology, or should there be a stand-alone framework methodology for removals? Why or why not?
Comment	Emission reduction projects have standalone methodologies. The same should be maintained for CDR, in order to evaluate emissions removal in the most accurate way possible for every type of projects
Response from Methodology Developer	In response, we are developing the VT00XX: Tool for Differentiating Reductions and Removals in CCS Projects. This tool is designed to provide clear guidance and procedures for accurately distinguishing between reductions and removals, catering specifically to the diverse nature of CCS projects. It will address the fundamental differences and operational nuances between these two categories, ensuring accurate reporting and prevention of double-counting. Your feedback is forwarded to VERRA and CCS+ secretariat for their consideration.

Aster Global Findings Round 1	-	The development team took due account by developing a specific tool to provide guidance on how project proponents must handle the accounting of reductions and removals. The referenced Tool is not yet complete, and future references cannot be assessed. The Assessment team notes that the referenced tool appears to be a reasonable location to address the commenters suggestion.
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Item	70	
Comment Number	70	
Organization	Eni SpA	
Key Question	2. Given the high capital cost and long investment horizon of CCS projects, do you think a project approach or standardized approach is more appropriate for assessing additionality? Why?	
Comment	A project approach. CCS projects can be very different from one another in terms of technical difficulties reflecting this aspect on the costs. Costs related to separate and capture the CO2, transport costs from the source to the storage and injection costs can vary a lot. CCS projects should reflect the same approach of O&G projects, where, even if within a national framework, they are always evaluated stand alone.	
Response from Methodology Developer	Thank you for endorsing the project-based approach to assessing additionality in Carbon Capture and Storage (CCS)	
Aster Global Findings Round 1	-	The methodology development team chose to use a project-based approach for determining additionality which is in line with the commenters suggestion.

Item	71	
Comment Number	71	
Organization	Eni SpA	
Key Question	3. Should a standardized approach using activity penetration be used for assessing additionality for particular project types or capture technologies (such as DAC or other CDR technologies) instead of the project approach using investment analysis? Why or why not?	
Comment	Investment analysis allows to evaluate each project benefits and eligibility for carbon credits generations. Activity penetration might provide to misleading results, like to consider the technological penetration as homogeneous in a single country	
Response from Methodology Developer	Thank you for endorsing the project-based approach to assessing additionality in Carbon Capture and Storage (CCS).	
Aster Global Findings Round 1	-	The methodology development team chose to use a project-based approach for determining additionality which is in line with the commenters suggestion.

Item	72
Comment Number	72
Organization	Eni SpA
Key Question	4. When establishing a positive list (activity penetration) for assessing additionality, how would the maximum adoption potential of DAC or other capture technologies be measured? What data sources might inform this?

Comment	Maximum adoption potential for CCS from source points might be the amount of CO2 captured over the overall emissions of that sector in that geographical area / country. DAC should always be considered positive (then subject to investment analysis)
Response from Methodology Developer	We forwarded your comment to VERRA and where they can continuously evaluate adding the standardized approach in periodic reviews of the methodology
Aster Global Findings Round 1	The methodology developers revised additionality to use the project method and not a standardized approach. The standardized approach would use activity penetration.

Item	73
Comment Number	73
Organization	Eni SpA
Key Question	5. When assessing additionality using activity penetration, how would the maximum adoption potential of DAC facility be measured? What data sources might inform this?
Comment	DAC should always be considered positive (then subject to investment analysis)
Response from Methodology Developer	We forwarded your comment to VERRA and where they can continuously evaluate adding the standardized approach in periodic reviews of the methodology
Aster Global Findings Round 1	The methodology developers revised additionality to use the project method and not a standardized approach. The standardized approach would use activity penetration.

Item	74
Comment Number	74
Organization	Eni SpA
Key Question	6. Is a maximum IRR of 21% appropriate for the risk-return profile for CCS technologies in the coming 5-10 years? What alternative maximum IRR would you suggest and why?
Comment	Considering the nature of the activity, similar to an O&G upstream project, and the small number of large scale projects, it is reasonable.
Response from Methodology Developer	Thank you for endorsing benchmark value.
Aster Global Findings Round 1	The methodology development team chose to use 21% for the IRR which is in line with the commenters suggestion. After the findings were closed, Verra modified the methodology. These changes were driven by Verra requirements, moving guidance to the modules, updating to the current Verra style guide and to align the methodology to the ICVCM.

Item	75
Comment Number	75
Organization	Eni SpA
Key Question	7. What types of construction, fabrication or production emissions in DAC projects or other projects may be material to the overall emissions quantification and why?

Comment	Evaluating the LCA of the construction and fabrication for DAC facilities. Production emissions are already accounted for in the methodology
Response from Methodology Developer	Thank you for your feedback and endorsing our approach.
Aster Global Findings Round 1	- The methodology development team chose to include production emissions in the quantification procedures which is in line with the commenters suggestion.

Item	76
Comment Number	76
Organization	Eni SpA
Key Question	8. What risks would purpose-built green PPAs pose to credit integrity? How could these be managed? Are there existing standards, regulations, or other sources that provide guidance related to accounting emission benefits of purpose-built green PPAs?
Comment	If the economical additionality is respected, they do not pose problems for credit integrity or credibility
Response from Methodology Developer	VERRA published Electricity tool for PPAs. We forwarded your comments to VERRA.
Aster Global Findings Round 1	- The question posed by verra relates to a verra published electricity tool for PPAs, the development team took due account of the commenters response by passing the information to Verra.

Item	77
Comment Number	77
Organization	Eni SpA
Key Question	9. Is a simplified approach to quantifying small transport emission segments appropriate and why? Are the thresholds and emission intensities proposed appropriate? If not, please explain why and include alternatives with data sources.
Comment	It is appropriate. Small transport does not have a real impact on the amount of emissions that are avoided / removed. A simplified approach can maintain a conservative stance while simplifying the accounting procedure.
Response from Methodology Developer	Thank you for endorsing our approach.
Aster Global Findings Round 1	- The methodology development team chose to use a simplified approach to quantifying transportation emissions which is in line with the commenters suggestion.

Item	78
Comment Number	78
Organization	Eni SpA
Key Question	10. What differences in monitoring and long-term risk of reversals exist between storage in saline aquifers and depleted oil and gas reservoirs? Do you think requirements would be different enough to justify having separate modules? Why or why not?

Comment	Depleted hydrocarbon reservoirs are for sure safe storage sites, since they trapped hydrocarbons (lighter than CO2) for million of years. Anyway, maintain the same approach can be helpfull to develop a standardized approache and improve storage security.
Response from Methodology Developer	Thank you for your feedback. An updated storage module that covers both storage options is being developed. VMD00XX: Module for CO2 Storage in Saline Aquifers and Depleted Hydrocarbon Reservoirs
Aster Global Findings - Round 1	The referenced module is not yet complete, and future references cannot be assessed. The Assessment team notes that the referenced module appears to be a reasonable location to address the commentors concern.

Item	79
Comment Number	79
Organization	Olawuyi Racett Nigeria Ltd.,
Key Question	3. Should a standardized approach using activity penetration be used for assessing additionality for particular project types or capture technologies (such as DAC or other CDR technologies) instead of the project approach using investment analysis? Why or why not?
Comment	A standardized approach is preferable and more suitable for CCS projects because of the long term investments required for them, and the fact that eligibility can be determined early in the project life cycle.
Response from Methodology Developer	<p>We recognize the advantages of a standardized approach, particularly in reducing administrative burdens. However, after careful consideration, we've chosen the Project Method due to the unique complexities of CCS projects:</p> <p>Tailored Evaluations: CCS projects operate in varied regulatory, technological, and market environments, requiring customized assessments to accurately identify additionality.</p> <p>Investment and Technology Considerations: The high capital requirements and diverse technologies across CCS projects necessitate a detailed analysis of financial and technological barriers, which the Project Method provides.</p> <p>Adaptability: The dynamic nature of the CCS sector, with evolving policies and market conditions, calls for an adaptable assessment method like the Project Method to ensure accurate and current evaluations.</p> <p>We forwarded your comment to VERRA and where they can continously evaluate adding the standized apprach in periodic reviews of the methodology</p>
Aster Global Findings - Round 1	The methodology development teams response took due account of the comment by explaining the rational behind moving forward with the project method for additionality. Specifically, a project method allows for more flexibility to address technology/financial challenges, and will be more adaptable to the varied regulatory landscapes project proponents will face.

Item	80
Comment Number	80
Organization	Olawuyi Racett Nigeria Ltd.,
Key Question	6. Is a maximum IRR of 21% appropriate for the risk-return profile for CCS technologies in the coming 5-10 years? What alternative maximum IRR would you suggest and why?

Comment	There should be no limit on the internal rate of return for investing in CCs projects. The investor is the one with the funding to execute the project and therefore should not be restricted in terms of limiting his or her potential profit in agreeing and proposing to implement a CCS Project or Technology.
Response from Methodology Developer	Suggesting no limit would likely make the additionality criterion too lenient, allowing projects that are already financially viable without carbon finance to qualify for carbon credits. This could undermine the integrity of the carbon market by rewarding projects that do not contribute additional greenhouse gas reductions. The goal is to find a balance where the IRR benchmark accurately reflects the risk-adjusted return that investors
Aster Global Findings Round 1	The development teams response takes due account of the comment by clearly explaining the rational for including a IRR, which would prioritize funding to projects that would not be financially viable with carbon finance. After the findings were closed, Verra modified the methodology. These changes were driven by Verra requirements, moving guidance to the modules, updating to the current Verra style guide and to align the methodology to the ICVCM.

Item	81
Comment Number	81
Organization	Evident
Key Question	8. What risks would purpose-built green PPAs pose to credit integrity? How could these be managed? Are there existing standards, regulations, or other sources that provide guidance related to accounting emission benefits of purpose-built green PPAs?

Comment	<p>Purpose-built green Power Purchase Agreements (PPAs) hold immense potential in driving the adoption of renewable energy and demonstrating commitment to clean electricity procurement. However, if not appropriately managed, these agreements can pose risks to credit integrity, particularly in terms of accurately accounting for emission benefits. To effectively manage the risks associated with purpose-built green PPAs, we strongly recommend the parallel use and retirement of Energy Attribute Certificates (EACs). EACs provide a robust mechanism to avoid any double counting of renewable generation and consumption, ensuring accurate claims of renewable energy usage through contractually defined emissions ownership agreements.</p> <p>Fortunately, suitable protocols already exist and have been successfully implemented in various regions, including the European Union (EU) through the Guarantee of Origin (GoO), the United States, and more than 50 countries adherent to the I-REC Tracking Standard (https://www.irecstandard.org/). Leveraging these existing mechanisms will allow project proponents to verify the emissions of each direct air capture (DAC) facility accurately.</p> <p>EACs offer several key benefits:</p> <ol style="list-style-type: none"> 1. Trustworthy Verification: EACs provide a transparent and credible foundation for verifying claims of renewable electricity usage, mitigating concerns of double counting and ensuring accurate emission accounting. 2. Adherence and Simplification: The use of EACs eases adherence for both declarants and verification bodies, streamlining the process of validating renewable energy consumption. 3. Market-Based Pressure: By implementing EACs, we can increase the value of renewable energy and create market-based pressure for further expansion of renewable energy sources, encouraging sustainable growth. <p>As a company deeply invested in promoting the clean economy and sustainability through robust tracking and certification, we believe that integrating EACs with purpose-built green PPAs is a pivotal step in enhancing credit integrity and promoting transparent and accountable environmental practices.</p> <p>In conclusion, we urge project proponents to embrace EACs as complementary tools to verify the emissions of each direct air capture (DAC) facility. By doing so, we can foster a more reliable and robust system that promotes the responsible procurement of renewable energy as direct air capture scales globally.</p>
Response from Methodology Developer	VERRA published Electricity tool for PPAs. We forwarded your comments to VERRA.
Aster Global Findings - Round 1	The question posed by verra relates to a verra published electricity tool for PPAs, the development team took due account of the commenters response by passing the information to Verra.

Item	82
Comment Number	82
Organization	ClimeCo LLC
Key Question	1. Can emissions reductions and CDR be addressed under a single framework methodology, or should there be a stand-alone framework methodology for removals? Why or why not?
Comment	With significant differences in market valuation between removal and avoidance credits, and considering Verra's plan to label VCS removals, accounting would be simplified if projects generated only removal or avoidance credits.

Response from Methodology Developer	In response, we are developing the VT00XX: Tool for Differentiating Reductions and Removals in CCS Projects. This tool is designed to provide clear guidance and procedures for accurately distinguishing between reductions and removals, catering specifically to the diverse nature of CCS projects. It will address the fundamental differences and operational nuances between these two categories, ensuring accurate reporting and prevention of double-counting. Your feedback is forwarded to VERRA and CCS+ secretariat for their consideration.
Aster Global Findings Round 1	The development team took due account by developing a specific tool to provide guidance on how project proponents must handle the accounting of reductions and removals. The referenced Tool is not yet complete, and future references cannot be assessed. The Assessment team notes that the referenced tool appears to be a reasonable location to address the commentors suggestion.

Item	83
Comment Number	83
Organization	ClimeCo LLC
Key Question	2. Given the high capital cost and long investment horizon of CCS projects, do you think a project approach or standardized approach is more appropriate for assessing additionality? Why?
Comment	Standardized (all projects are 'additional' until such time sector specific penetration rates have been reached). Other than government programs and grants, there are no other revenue streams, available for storage of CO2. Projects face many more barriers to implementation than just economic. Technological, regulatory, operational etc. High risk project type with no revenue certainty.
Response from Methodology Developer	<p>We've chosen the Project Method due to the unique complexities of CCS projects:</p> <p>Tailored Evaluations: CCS projects operate in varied regulatory, technological, and market environments, requiring customized assessments to accurately identify additionality.</p> <p>Investment and Technology Considerations: The high capital requirements and diverse technologies across CCS projects necessitate a detailed analysis of financial and technological barriers, which the Project Method provides.</p> <p>Adaptability: The dynamic nature of the CCS sector, with evolving policies and market conditions, calls for an adaptable assessment method like the Project Method to ensure accurate and current evaluations.</p> <p>We forwarded your comment to VERRA and where they can continuously evaluate adding the standardized approach in periodic reviews of the methodology</p>
Aster Global Findings Round 1	The methodology development teams response took due account of the comment by explaining the rationale behind moving forward with the project method for additionality. Specifically, a project method allows for more flexibility to address technology/financial challenges, and will be more adaptable to the varied regulatory landscapes project proponents will face.

Item	84
Comment Number	84

Organization	ClimeCo LLC
Key Question	3. Should a standardized approach using activity penetration be used for assessing additionality for particular project types or capture technologies (such as DAC or other CDR technologies) instead of the project approach using investment analysis? Why or why not?
Comment	We do not think activity penetration is appropriate for DAC. For other CCS applications, penetration should be assessed on a sector basis rather than on technology implemented. Do not want to force use of new unproven technologies for an already high risk project type.
Response from Methodology Developer	Thank you for endorsing the project-based approach to assessing additionality in Carbon Capture and Storage (CCS).
Aster Global Findings Round 1	- The methodology development team chose to use a project-based approach for determining additionality which is in line with the commenters suggestion.

Item	85
Comment Number	85
Organization	ClimeCo LLC
Key Question	4. When establishing a positive list (activity penetration) for assessing additionality, how would the maximum adoption potential of DAC or other capture technologies be measured? What data sources might inform this?
Comment	As mentioned above, we do not believe activity penetration rates are appropriate for DAC. For other capture technologies it should be based on sector uptake of CCS rather than the specific technology used in the capture process. If 5% of any given sector is implementing CCS without the use of offsets (need), then the sector is no longer additional. Costs of capture vary between concentrations of CO2 more than technology used. Technologies that are most effective given certain industrial conditions should be the technology of choice rather than using a less effective or less proven technology due to penetration rate restrictions.
Response from Methodology Developer	We forwarded your comment to VERRA and where they can continuously evaluate adding the standardized approach in periodic reviews of the methodology
Aster Global Findings Round 1	- The methodology developers revised additionality to use the project method and not a standardized approach. The standardized approach would use activity penetration.

Item	86
Comment Number	86
Organization	ClimeCo LLC
Key Question	5. When assessing additionality using activity penetration, how would the maximum adoption potential of DAC facility be measured? What data sources might inform this?
Comment	We do not think penetration rate for DAC is the right metric. There is no metric for comparison; 5% of what? We think the financial additionality test should suffice for DAC projects.
Response from Methodology Developer	We forwarded your comment to VERRA and where they can continuously evaluate adding the standardized approach in periodic reviews of the methodology

Aster Global Findings Round 1	- The methodology developers revised additionality to use the project method and not a standardized approach. The standardized approach would use activity penetration.
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Item	87
Comment Number	87
Organization	ClimeCo LLC
Key Question	6. Is a maximum IRR of 21% appropriate for the risk-return profile for CCS technologies in the coming 5-10 years? What alternative maximum IRR would you suggest and why?
Comment	We believe 21% IRR before offset revenue is appropriate due to significant other barriers and risk factors associated with CCS projects.
Response from Methodology Developer	Thank you for endorsing benchmark value.
Aster Global Findings Round 1	- The methodology development team chose to use 21% for the IRR which is in line with the commenters suggestion. After the findings were closed, Verra modified the methodology. These changes were driven by Verra requirements, moving guidance to the modules, updating to the current Verra style guide and to align the methodology to the ICVCM.

Item	88
Comment Number	88
Organization	ClimeCo LLC
Key Question	7. What types of construction, fabrication or production emissions in DAC projects or other projects may be material to the overall emissions quantification and why?
Comment	Production and transport of chemical solutions used in capture process. Must be changed out frequently due to degradation.
Response from Methodology Developer	Thank you for your feedback. Embodied emissions from energy consumption and material use are included in the quantification procedures.
Aster Global Findings Round 1	- The methodology development team chose to include embodied emissions from energy and material consumption in the quantification procedures which is in line with the commenters suggestion.

Item	89
Comment Number	89
Organization	ClimeCo LLC
Key Question	8. What risks would purpose-built green PPAs pose to credit integrity? How could these be managed? Are there existing standards, regulations, or other sources that provide guidance related to accounting emission benefits of purpose-built green PPAs?
Comment	RECs and time-stamped RECs could be used to ensure all electricity used is actually coming from renewable sources. Purpose built green PPAs/projects could be supplemented with RECs from other projects when the project is using grid electricity using a bundled or portfolio approach. There are new and emerging tools that will track real time emissions from a local grid - something to watch for future iterations.

Response from Methodology Developer	VERRA published Electricity tool for PPAs. We forwarded your comments to VERRA.
Aster Global Findings Round 1	- The question posed by verra relates to a verra published electricity tool for PPAs, the development team took due account of the commenters response by passing the information to Verra.

Item	90
Comment Number	90
Organization	ClimeCo LLC
Key Question	9. Is a simplified approach to quantifying small transport emission segments appropriate and why? Are the thresholds and emission intensities proposed appropriate? If not, please explain why and include alternatives with data sources.
Comment	Yes it is appropriate because transport emissions represent a non-material portion of overall emissions.
Response from Methodology Developer	Thank you for endorsing our approach.
Aster Global Findings Round 1	- The methodology development team chose to use a simplified approach to quantifying transportation emissions which is in line with the commenters suggestion.

Item	91
Comment Number	91
Organization	ReNew
Key Question	1. Can emissions reductions and CDR be addressed under a single framework methodology, or should there be a stand-alone framework methodology for removals? Why or why not?

<p>Comment</p>	<p>CCS/CCUS can facilitate the transition to net-zero CO2 emissions by tackling emissions from existing assets. It provides a way to address emissions from some of the most hard to abate sectors. It further enables CO2 removal from the atmosphere through BECCS and DACCS.</p> <p>According to IEA, by 2030, 1.6 Gt CO2 per year is expected to be captured globally, rising to 7.6 Gt CO2 by 2050. Now in order to scale to such ambitious targets, significant progress has to be made in the CDR technology front. While there could be several CDR technologies, but, due to technology type and significant high capex requirement, it is suggested to keep DAC as a separate standalone CDR methodology, while the other CDR technologies can be clubbed under a common framework methodology. Something similar to a POA framework could be envisaged for the other CDR technologies.</p> <p>So we propose to include all types of possible DAC technology to be clubbed under a common framework methodology, that can include the following categories.</p> <ol style="list-style-type: none"> 1. DAC + End Use (It is observed that in the current draft methodology, the utilization aspect has been left out. We strongly believe, DAC projects even if includes any utilization value, that should as well be a part of the common DAC methodology) 2. DAC using rock weathering - DAC is a niche technology that not just can use sorbent (solid) and solvent (liquid) chemical based CO2 capture, but also may use ERW (enhanced rock weathering technology). It is hugely scalable, as suitable rocks such as basalt and olivine, and related industries for rock mining, grinding and spreading, are well-established across the world. 3. DAC with sequestration (DACCS) - This is already covered under draft methodology. 4. DAC plus point source - This could possibly a technology blend, especially in the Natural gas power generation and CO2-emitting industrial sectors, such as cement and steel production are particular priorities. <p>All CDR technologies including DAC have been found to be most effective to fight</p>
<p>Response from Methodology Developer</p>	<p>In response, we are developing the VT00XX: Tool for Differentiating Reductions and Removals in CCS Projects. This tool is designed to provide clear guidance and procedures for accurately distinguishing between reductions and removals, catering specifically to the diverse nature of CCS projects. It will address the fundamental differences and operational nuances between these two categories, ensuring accurate reporting and prevention of double-counting. Your feedback is forwarded to VERRA and CCS+ secretariat for their consideration.</p>
<p>Aster Global Findings Round 1</p>	<p>The methodology developers response identified a coming tool that will ensure reductions and removals are differentiated and properly accounted for but it is unclear to the assessment team how this response considers the commenters suggestion that the various DAC technologies have their own methodology framework.</p>
<p>Aster Global Round 1 Findings (NCR/CL/OFI)</p>	<p>CL: Please clarify in line with the finding and the original comment</p>

Round 1 Response from Methodology Developer	We appreciate the feedback from the public but we do not see the feedback is relevant for the methodology, since CCS+ chooses a modular framework to include all types of capture technologies under a CCS methodology framework. However to ensure comprehensive consideration of stakeholder insights, this comment has been forwarded to VERRA for potential future updates in methodology.
Aster Global Round 2 Findings (NCR/CL/OFI)	Finding is closed.

Item	92
Comment Number	92
Organization	ReNew
Key Question	2. Given the high capital cost and long investment horizon of CCS projects, do you think a project approach or standardized approach is more appropriate for assessing additionality? Why?
Comment	<p>Generally, Capex for DAC based CO2 removal can vary from \$180-\$400/MT CO2(Source : IEA). A second type of DAC technology uses amine absorbents in small, modular reactors, and is developed by the Swiss firm Climeworks. While this type of DAC currently has higher costs of about \$600 to \$800 per ton of CO2 removed, the potential for savings is thought to be greater because the modular design could be made on an industrial production line and waste heat could be used instead of additional energy. However, there are several challenges to deploying DAC at the scale deemed necessary by climate models, including resource limitations and risks. Barriers to scaling up direct air capture (DAC) include high costs, the lack of an existing market for carbon removal, and the need to develop significant infrastructure like geologic storage wells and clean energy sources. Hence, DAC based CCS should have standardized approach using activity penetration for assessing additionality.</p> <p>Even the other capture CDR technologies like (a) biomass fermentation b) post combustion capture from power plants c) flue gas capture from industrial process) has a capex around \$100/MT CO2 reduction. Given the complexity of the technology, the low penetration of overall CCS projects, the investment risk, operation risk, policy and regulatory uncertainties, we suggest the other capture technologies to be have a standardized approach as well using activity penetration to demonstrate additionality.</p>
Response from Methodology Developer	Thank you for sharing your in-depth insights on the cost dynamics and operational challenges of Direct Air Capture (DAC) and other Carbon Dioxide Removal (CDR) technologies. Your thorough analysis, which brings to light the cost comparisons and technological challenges, reinforces the need for project based approaches in the assessment of additionality for CCS projects. The notable variation in capital expenditures across CDR technologies, with DAC incurring higher initial costs relative to technologies such as biomass fermentation, post-combustion capture, and flue gas capture from industrial processes, highlights the necessity of a project-based approach. Such an approach is essential to effectively address and accommodate the distinct characteristics and financial requisites of each project.

Aster Global Findings Round 1	The methodology development teams response took due account of the comment by explaining the rational behind moving forward with the project method for additionality. Specifically, a project method allows for more flexibility to address technology/financial challenges, and will be more adaptable to the varied regulatory landscapes project proponents will face.
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Item	93
Comment Number	93
Organization	ReNew
Key Question	3. Should a standardized approach using activity penetration be used for assessing additionality for particular project types or capture technologies (such as DAC or other CDR technologies) instead of the project approach using investment analysis? Why or why not?
Comment	At present there are only 27 commissioned DAC plants worldwide capturing almost 0.01 million T CO2/year. Including DAC, there are barely 147 CCS projects (Source: https://netl.doe.gov/carbon-management/carbon-storage/worldwide-ccs-database) which are at different stages of planning, development and construction across the world. Hence, as has already been mentioned in the earlier point, considering the high capex, technology barrier, all CCS should be subjected to standardized approach using activity penetration for assessing additionality. The criteria for inclusion in positive list has been briefed in the question below. Till the time the projects meet the positive list criteria, the standardized approach should suffice as proof for additionality. Post that, investment analysis using CDM Tool 1 and Tool 27 could be used to prove financial additionality.
Response from Methodology Developer	We forwarded your comment to VERRA and where they can continuously evaluate adding the standized apprach in periodic reviews of the methodology
Aster Global Findings Round 1	The methodology developers revised additionality to use the project method and not a standardized approach. The standardized approach would use activity penetration.

Item	94
Comment Number	94
Organization	ReNew
Key Question	4. When establishing a positive list (activity penetration) for assessing additionality, how would the maximum adoption potential of DAC or other capture technologies be measured? What data sources might inform this?
Comment	As per IEA estimates, By 2030,1.6 Gt of CO2 is required to be captured by CCUS projects (in order to capture 7.6 Gt by 2050) worldwide to achieve net zero emissions (https://www.iea.org/reports/net-zero-by-2050). We suggest till the time CCUS/CCS CDR projects remove 10% of the target removal, the activity penetration aspect should be used and these projects should be included in positive list for demonstration of additionality. Without such approach for proving additionality for CCS projects, it would become practically impossible to achieve the emission targets as laid out by IPCC/IEA. Hence, there is a need to actively implement CCS/CCUS projects using activity penetration to demonstrate additionality, so as to achieve tangible results.

Response from Methodology Developer	We forwarded your comment to VERRA and where they can continuously evaluate adding the standardized approach in periodic reviews of the methodology
Aster Global Findings Round 1	The methodology developers revised additionality to use the project method and not a standardized approach. The standardized approach would use activity penetration.

Item	95
Comment Number	95
Organization	ReNew
Key Question	5. When assessing additionality using activity penetration, how would the maximum adoption potential of DAC facility be measured? What data sources might inform this?
Comment	Detailed in Qs No. 4
Response from Methodology Developer	We forwarded your comment to VERRA and where they can continuously evaluate adding the standardized approach in periodic reviews of the methodology
Aster Global Findings Round 1	The methodology developers revised additionality to use the project method and not a standardized approach. The standardized approach would use activity penetration.

Item	96
Comment Number	96
Organization	ReNew
Key Question	6. Is a maximum IRR of 21% appropriate for the risk-return profile for CCS technologies in the coming 5-10 years? What alternative maximum IRR would you suggest and why?
Comment	<p>In the event standardized approach for complying with additionality using 'activity penetration' approach is no longer applicable, then for financial investment analysis based additionality compliance, modifications w.r.t to relevant CDM tools are suggested.</p> <p>It is understood that CCS, being a project with nascent technologies, pose several unseen risk during operation stage.</p> <p>Appendix of CDM Tool 27 clubs CCS projects in Group 2, with a IRR base of 10.77% for 2019. It is less likely that global inflation would get back at pre-pandemic level. We have worked with Nov 2022 inflation of 6.12%, (IMF projected 6.5% global inflation for 2023, however, we are working with Nov 2022 level)</p> <p>Nominal Benchmark = $\{(1+\text{Real Benchmark}) * (1+\text{Inflation rate})\} - 1$ (works out as 22.39% or 23% appx)</p> <p>Hence, it is suggested that the maximum IRR capping of 21% be increased in methodology to 23%.</p> <p>While 23% maximum IRR capping can be retained for CO2 capture technologies, barring DAC.</p> <p>For DAC capture technology, considering extent of risk involved, the IRR base as mentioned in Tool 27 looks too low. Hence assuming an IRR base of 14% for 2019, the benchmark IRR works out to be 25.96% or 26% keeping the inflation numbers same as above.</p>

Response from Methodology Developer	Thank you for your feedback. We forwarded your suggestions to VERRA where they can continuously evaluate revising the additionality in periodic reviews of the methodology
Aster Global Findings - Round 1	It is unclear to the assessment team how the developers response takes due account of the comment.
Aster Global Round 1 Findings (NCR/CL/OFI)	CL: Please clarify in line with the finding and the original comment
Round 1 Response from Methodology Developer	Commentor suggested IRR benchmark should be higher than the 21%. However to be conservative methodology developers prefer to stay with current references and 21%.
Aster Global Round 2 Findings (NCR/CL/OFI)	Finding is closed. After the findings were closed, Verra modified the methodology. These changes were driven by Verra requirements, moving guidance to the modules, updating to the current Verra style guide and to align the methodology to the ICVCM.

Item	97
Comment Number	97
Organization	ReNew
Key Question	7. What types of construction, fabrication or production emissions in DAC projects or other projects may be material to the overall emissions quantification and why?
Comment	In the absence of publicly available emission data for proven CCS technologies, it is difficult to specifically mention exact construction/design or fabrication related emission that can be material to the project. But our suggestion is that while there should be proper labelling of CO2 emission data for construction equipments, fabrication design, but these should not be part of project emission computations. As technology is quickly evolving, hence till it matures, it would be apt to keep this materiality threshold for construction, production emission, fabrication design to be kept out of project emission. However, project proponents may be allowed to buy carbon credits to compensate for the emissions caused by EPC for the materials used at capture.
Response from Methodology Developer	Thank you for your feedback and endorsing our approach.
Aster Global Findings - Round 1	The methodology development team chose exclude construction emission in the quantification procedures which is in line with the commenters suggestion.

Item	98
Comment Number	98
Organization	ReNew
Key Question	8. What risks would purpose-built green PPAs pose to credit integrity? How could these be managed? Are there existing standards, regulations, or other sources that provide guidance related to accounting emission benefits of purpose-built green PPAs?
Comment	NA
Response from Methodology Developer	VERRA published Electricity tool for PPAs. We forwarded your comments to VERRA.

Aster Global Findings Round 1	-	The question posed by verra relates to a verra published electricity tool for PPAs, the development team took due account of the commenters response by passing the information to Verra.
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Item	99	
Comment Number	99	
Organization	ReNew	
Key Question	9. Is a simplified approach to quantifying small transport emission segments appropriate and why? Are the thresholds and emission intensities proposed appropriate? If not, please explain why and include alternatives with data sources.	
Comment	For any transport emission, we think the electricity, fuel consumption, loading/unloading from CO2 from ships/ train/trucks, holding CO2 conditions etc are adequate and accurately captures in the project emission. Hence Option A: Direct Monitoring of Fuel, Electricity and Heat Consumption is suggested to be used. As against, default value options, the Option A provides realistic computation of the actual emissions, thereby increasing the quality of carbon credit.	
Response from Methodology Developer	Thank you for endorsing our approach.	
Aster Global Findings Round 1	-	It is unclear to the assessment team how the response properly addresses the commenters suggestion to use Option A for calculating all transportation emissions.
Aster Global Round 1 Findings (NCR/CL/OFI)	1	CL: Please clarify in line with the finding and the original comment
Round 1 Response from Methodology Developer		Project developers can choose option a so transport module is inline with the commentor's suggestion.
Aster Global Round 2 Findings (NCR/CL/OFI)	2	Finding is closed.

Item	100	
Comment Number	100	
Organization	ReNew	
Key Question	10. What differences in monitoring and long-term risk of reversals exist between storage in saline aquifers and depleted oil and gas reservoirs? Do you think requirements would be different enough to justify having separate modules? Why or why not?	
Comment	The monitoring methods and long term risks are different, but for ease of registration, we suggest having a single methodology for geological storage and sequestration. Process for both can be detailed though in the common methodology.	
Response from Methodology Developer	Thank you for your feedback. An updated storage module that covers both storage options is being developed. VMD00XX: Module for CO2 Storage in Saline Aquifers and Depleted Hydrocarbon Reservoirs	
Aster Global Findings Round 1	-	The referenced module is not yet complete, and future references cannot be assessed. The Assessment team notes that the referenced module appears to be a reasonable location to address the commenters concern.

Item	101
Comment Number	101

Organization	CES Environmental Solutions
Key Question	1. Can emissions reductions and CDR be addressed under a single framework methodology, or should there be a stand-alone framework methodology for removals? Why or why not?
Comment	Projects should be addressed under a stand-alone framework methodology rather than a single framework. Emissions reductions and CDR projects often have different characteristics, technologies, and objectives. Combining them under a single framework might lead to oversimplification or inappropriate treatment of the unique aspects of each type of project. Having separate frameworks allows for tailored approaches that address specific challenges related to each method effectively.
Response from Methodology Developer	In response, we are developing the VT00XX: Tool for Differentiating Reductions and Removals in CCS Projects. This tool is designed to provide clear guidance and procedures for accurately distinguishing between reductions and removals, catering specifically to the diverse nature of CCS projects. It will address the fundamental differences and operational nuances between these two categories, ensuring accurate reporting and prevention of double-counting. Your feedback is forwarded to VERRA and CCS+ secretariat for their consideration.
Aster Global Findings Round 1	The development team took due account by developing a specific tool to provide guidance on how project proponents must handle the accounting of reductions and removals. The referenced Tool is not yet complete, and future references cannot be assessed. The Assessment team notes that the referenced tool appears to be a reasonable location to address the commentors suggestion.

Item	102
Comment Number	102
Organization	CES Environmental Solutions
Key Question	2. Given the high capital cost and long investment horizon of CCS projects, do you think a project approach or standardized approach is more appropriate for assessing additionality? Why?
Comment	A project approach would be more appropriate for assessing additionality in CCS .A project approach allows for a customized evaluation of each CCS initiative. It considers the project's unique features, the technology utilized, the location, and the carbon capture potential. By tailoring the assessment, it becomes easier to gauge the project's true additionality, ensuring that it wouldn't have occurred without the support of climate finance mechanisms.
Response from Methodology Developer	Thank you for endorsing the project-based approach to assessing additionality in Carbon Capture and Storage (CCS)
Aster Global Findings Round 1	The methodology development team chose to use a project-based approach for determining additionality which is in line with the commenters suggestion.

Item	103
Comment Number	103
Organization	CES Environmental Solutions

Key Question	3. Should a standardized approach using activity penetration be used for assessing additionality for particular project types or capture technologies (such as DAC or other CDR technologies) instead of the project approach using investment analysis? Why or why not?
Comment	A standardized approach using activity penetration should not be used as the sole method for assessing additionality. A standardized approach based on activity penetration may not adequately capture the unique characteristics of individual projects or technologies. DAC and other CDR technologies can vary significantly in terms of scale, efficiency, and geographical applicability.
Response from Methodology Developer	Thank you for endorsing the project-based approach to assessing additionality in Carbon Capture and Storage (CCS).
Aster Global Findings Round 1	- The methodology development team chose to use a project-based approach for determining additionality which is in line with the commenters suggestion.

Item	104
Comment Number	104
Organization	CES Environmental Solutions
Key Question	4. When establishing a positive list (activity penetration) for assessing additionality, how would the maximum adoption potential of DAC or other capture technologies be measured? What data sources might inform this?
Comment	One way to do this is by utilizing data sources that provide accurate and comprehensive information about relevant factors. Satellite information can indeed be a valuable data source due to its precision and ability to cover large geographic areas. Satellite data can be used to monitor and verify their performance and contribution to emission reductions over time.
Response from Methodology Developer	We forwarded your comment to VERRA and where they can continuously evaluate adding the standized apprach in periodic reviews of the methodology
Aster Global Findings Round 1	- The methodology developers revised additionality to use the project method and not a standardized approach. The standardized approach would use activity penetration.

Item	105
Comment Number	105
Organization	CES Environmental Solutions
Key Question	5. When assessing additionality using activity penetration, how would the maximum adoption potential of DAC facility be measured? What data sources might inform this?
Comment	Due to satellite data can provide accurate and valuable insights that will ensure a more robust assessment of the maximum adoption potential of DAC and other capture technologies, leading to informed decisions and effective climate change mitigation strategies.
Response from Methodology Developer	NA
Aster Global Findings Round 1	- The methodology developers revised additionality to use the project method and not a standardized approach. The standardized approach would use activity penetration.

Item	106
Comment Number	106
Organization	CES Environmental Solutions
Key Question	6. Is a maximum IRR of 21% appropriate for the risk-return profile for CCS technologies in the coming 5-10 years? What alternative maximum IRR would you suggest and why?
Comment	I consider it must not be a maximum IRR. It is important to note that the specific IRR target should be carefully evaluated based on the unique circumstances of individual projects, regional market conditions, and the level of support from government incentives or carbon pricing mechanisms. A case-by-case assessment will help strike the right balance between making CCS technologies financially attractive for investors and ensuring profitability for landowners, ultimately driving progress in the fight against climate change.
Response from Methodology Developer	Thank you for your feedback. We forwarded your suggestions to VERRA where they can continuously evaluate revising the additionality in periodic reviews of the methodology
Aster Global Findings - Round 1	It is unclear to the assessment team how the developers response takes due account of the comment.
Aster Global Round 1 Findings (NCR/CL/OFI)	CL: Please clarify in line with the finding and the original comment
Round 1 Response from Methodology Developer	Methodogy emplys project based method to demonstrate additionality, which is in line with the commentors suggestion that a case by case assessment should be done.
Aster Global Round 2 Findings (NCR/CL/OFI)	Finding is closed. After the findings were closed, Verra modified the methodology. These changes were driven by Verra requirements, moving guidance to the modules, updating to the current Verra style guide and to align the methodology to the ICVCM.

Item	107
Comment Number	107
Organization	CES Environmental Solutions
Key Question	8. What risks would purpose-built green PPAs pose to credit integrity? How could these be managed? Are there existing standards, regulations, or other sources that provide guidance related to accounting emission benefits of purpose-built green PPAs?
Comment	These risks arise from the unique nature of these agreements, which are tailored specifically to support the financing and development of renewable energy projects, as volatility of offtaker's creditworthiness, project development and delays, mismatched contract terms, regulatory and policy risks. The measures to be considered must be due diligence and monitoring and reporting.
Response from Methodology Developer	VERRA published Electricity tool for PPAs. We forwarded your comments to VERRA.
Aster Global Findings - Round 1	The question posed by verra relates to a verra published electricity tool for PPAs, the development team took due account of the commenters response by passing the information to Verra.

Item	108
Comment Number	108

Organization	Nystart GmbH
Key Question	1. Can emissions reductions and CDR be addressed under a single framework methodology, or should there be a stand-alone framework methodology for removals? Why or why not?
Comment	<p>Your question appears to be referring to whether emissions reductions through Carbon Capture and Storage (CCS) at point sources, and Carbon Dioxide Removal (CDR) from the atmosphere, should fall under the same framework. My response is an emphatic no.</p> <p>CCS at point sources and atmospheric CDR are vastly different processes, despite both being important elements of our response to climate change. Point sources usually relate to operations such as Oil Refining or Natural Gas Processing, where infrastructure initially created for oil and gas transport is repurposed. Meanwhile, storage often occurs in Depleted Oil and Gas Reservoirs or is used for enhanced oil recovery (EOR).</p> <p>Such practices risk not only providing the fossil fuel industry with continued profits based on their previous actions, but also threaten to overshadow genuine efforts towards climate change mitigation. Moreover, the flood of credits from these practices into the market could harm authentic projects and endanger the credibility of the Voluntary Carbon Market (VCM).</p> <p>The fossil fuel industry has reaped extensive benefits from what is essentially a resource owned by the planet. It's high time they shoulder the responsibility for the impacts of their actions. It's mind-boggling to think that organizations like Verra might allow the oil and gas industry to profit from reducing their emissions, rather than holding them accountable for the emissions they've caused historically. This scenario must be avoided to ensure our policies aim for real change, not merely sustaining past profit models.</p>
Response from Methodology Developer	In response, we are developing the VT00XX: Tool for Differentiating Reductions and Removals in CCS Projects. This tool is designed to provide clear guidance and procedures for accurately distinguishing between reductions and removals, catering specifically to the diverse nature of CCS projects. It will address the fundamental differences and operational nuances between these two categories, ensuring accurate reporting and prevention of double-counting. Your feedback is forwarded to VERRA and CCS+ secretariat for their consideration.
Aster Global Findings Round 1	The methodology developer took due account of the commenters concern that reductions and removals cannot be calculated in the same methodology, by developing a tool that will guide project developers in how to differentiate reductions and removals. The assessment team notes that this tool is not completed and therefore cannot be assessed; however, it appears that this tool is an appropriate location for this issue to be addressed.

Item	109
Comment Number	109
Organization	Nystart GmbH

Key Question	<p>2. Given the high capital cost and long investment horizon of CCS projects, do you think a project approach or standardized approach is more appropriate for assessing additionality? Why?</p>
Comment	<p>Given the significant capital investment and extended project timeline associated with Carbon Capture and Storage (CCS) projects, determining the most suitable approach for assessing additionality requires a thorough consideration of financial, environmental, and societal impacts.</p> <p>Despite the high costs, the importance of considering the overall beneficiaries and actors in these projects should not be underestimated when assessing additionality. This includes a clear understanding of how public investments and incentives are being utilized in these projects.</p> <p>In light of the extensive public funding allocated to CCS, as outlined in the Global Status of CCS 2022 report from the Global CCS Institute, the emphasis should be on ensuring that these investments lead to substantial and measurable progress in mitigating climate change. With billions allocated for CCS in the US through the Infrastructure Investment and Jobs Act (IIJA) and the Inflation Reduction Act, as well as significant funding in the EU through the Innovation Fund, the financial dimension of additionality is vital.</p> <p>In essence, while a project-based approach allows for the specifics of individual initiatives, a standardized approach could be more appropriate in this context. It can provide a uniform, clear, and consistent way to assess additionality across various projects, considering the scale of investment and the broad range of actors and beneficiaries involved. However, the priority should be to grant additionality for genuine Carbon Dioxide Removal (CDR) projects, differentiating them from CCS initiatives that could simply perpetuate the status quo.</p>
Response from Methodology Developer	<p>Thank you for your insightful comments on the complexities and significant financial commitments associated with Carbon Capture and Storage (CCS) projects. Your emphasis on understanding the broad financial, environmental, and societal impacts of these projects, including the roles of various beneficiaries and actors, is well-taken. The use of public investments and incentives in CCS projects, highlighted by substantial funding from initiatives like the US Infrastructure Investment and Jobs Act (IIJA) and the Inflation Reduction Act, as well as the EU Innovation Fund, indeed underscores the need for a meticulous approach in assessing additionality.</p> <p>Given the complexities outlined, including the significant capital investment, extended timelines, and the diverse stakeholders involved in CCS projects, we have opted for a project-based approach in assessing additionality. This method allows us to delve into the specifics of each initiative, accommodating the unique aspects of individual projects while thoroughly considering their financial, environmental, and societal impacts. This tailored approach is instrumental in ensuring that each project's contribution to climate change mitigation is accurately evaluated, particularly in the context of the substantial public funding involved.</p>

Aster Global Findings - Round 1	The methodology development teams response took due account of the comment by explaining the rational behind moving forward with the project method for additionality. Specifically, a project method allows for more flexibility to address technology/financial challenges, and will be more adaptable to the varied regulatory landscapes project proponents will face.
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Item	110
Comment Number	110
Organization	Nystart GmbH
Key Question	3. Should a standardized approach using activity penetration be used for assessing additionality for particular project types or capture technologies (such as DAC or other CDR technologies) instead of the project approach using investment analysis? Why or why not?
Comment	<p>When considering the assessment of additionality for specific project types or capture technologies like Direct Air Capture (DAC) or other Carbon Dioxide Removal (CDR) technologies, a standardized approach using activity penetration could offer several benefits.</p> <p>A standardized approach offers the potential for consistent and objective assessment criteria across various projects. The use of activity penetration specifically allows us to measure the extent of adoption of certain technologies in a particular industry or geographical region, which can be instrumental in understanding their impact and how far they have penetrated into common practice.</p> <p>Using this method, additionality can be ascertained by determining whether a project's technology is less commonly used than a defined benchmark level. This can help mitigate the risk of granting credits to projects that would have been implemented without the incentives offered by carbon credits, ensuring that these credits indeed contribute to additional emissions reductions.</p> <p>However, it is essential to remember that different projects and technologies might require specific considerations based on their unique contexts, which a standardized approach might overlook. A project approach using investment analysis, while more complex and time-consuming, can provide a more nuanced understanding of each project's financial viability and its need for additional support.</p> <p>In conclusion, a mixed approach could be most beneficial - a standardized approach using activity penetration for an initial, broad assessment, complemented by a project-based investment analysis for a more detailed, context-specific understanding. This would ensure that additionality is awarded to those projects genuinely contributing to our climate goals and would promote the development and wider adoption of effective CDR technologies.</p>
Response from Methodology Developer	We forwarded your comment to VERRA and where they can continuously evaluate adding the standized apprach in periodic reviews of the methodology
Aster Global Findings - Round 1	The methodology developers revised additionality to use the project method and not a standardized approach. The standardized approach would use activity penetration.

Item	111
Comment Number	111
Organization	Nystart GmbH
Key Question	4. When establishing a positive list (activity penetration) for assessing additionality, how would the maximum adoption potential of DAC or other capture technologies be measured? What data sources might inform this?
Comment	<p>When establishing a positive list for assessing additionality through activity penetration, measuring the maximum adoption potential of Direct Air Capture (DAC) or other carbon capture technologies can be quite complex. This is due to several factors including the nascent stage of these technologies, varying regional capabilities and regulations, and evolving cost and efficiency factors.</p> <p>One approach to estimating the maximum adoption potential could involve conducting technology feasibility studies. These studies would consider technological readiness, regional availability of necessary resources (like renewable energy sources for DAC), and the ability of different sectors or industries to integrate these technologies.</p> <p>Data sources that could inform these measurements include:</p> <ul style="list-style-type: none"> - Scientific Research and Technological Assessments: These sources offer insight into the technical feasibility and scalability of capture technologies. For example, the International Panel on Climate Change (IPCC) reports often include assessments of different CDR technologies. - Industry Reports and Market Analyses: Organizations like the Global CCS Institute, Energy Futures Initiative, or Carbon180 often produce detailed reports on the current state and future potential of carbon capture technologies. - Government Data and Policies: Data from environmental agencies or energy departments can provide information on current emissions levels, infrastructure, and policies that could influence the adoption of these technologies. Policies supporting or incentivizing CDR could indicate a higher potential for adoption. - Pilot Projects and Demonstrations: These can provide practical insights into the application and effectiveness of technologies under real-world conditions. - Expert Opinions and Consensus: Consultations with industry experts, researchers, and policymakers can help gauge the perceived potential and readiness of these technologies. <p>In conclusion, establishing a positive list would require a multi-faceted approach, considering a range of factors and data sources to accurately assess the maximum adoption potential. It's essential to update this regularly to reflect the</p>
Response from Methodology Developer	We forwarded your comment to VERRA and where they can continuously evaluate adding the standized apprach in periodic reviews of the methodology
Aster Global Findings Round 1	- The methodology developers revised additionality to use the project method and not a standardized approach. The standardized approach would use activity penetration.

Item	112
Comment Number	112
Organization	Nystart GmbH

Key Question	5. When assessing additionality using activity penetration, how would the maximum adoption potential of DAC facility be measured? What data sources might inform this?
Comment	<p>Assessing the maximum adoption potential of a Direct Air Capture (DAC) facility using activity penetration requires considering a multitude of factors. These include the current state of DAC technology, its applicability in different regions or industries, the cost of implementation and operation, and the availability of resources like renewable energy or funding.</p> <p>Here are some key methods and data sources that could inform this measurement:</p> <ul style="list-style-type: none"> - Technological Feasibility Studies: These studies look into the current capabilities and future potential of DAC technology. They can inform about the technological readiness and the scalability of DAC facilities. - Industry-Specific Reports: Reports from organizations like the International Energy Agency (IEA) or the Global CCS Institute provide comprehensive data on the state of DAC technology, including its effectiveness, operational costs, and advancements. - Market Adoption and Pilot Projects: The number of DAC facilities in operation and their performance can provide a practical perspective on adoption. Pilot projects, in particular, offer crucial insights into real-world performance and potential issues that might arise during scaling. - Regional Feasibility: Regional factors such as the availability of renewable energy (which DAC operations can be energy-intensive), geological storage capacity, and local regulations can significantly impact the adoption potential of DAC facilities. - Government Policies and Investment: Data on government incentives, subsidies, or funding for DAC technology can help predict its future adoption. For instance, enhancement in policies like the 45Q tax credit in the US could greatly increase the feasibility of DAC projects. - Expert Opinions and Consultations: Engaging with industry experts, academics, and policymakers can provide valuable insights into the perceived potential and limitations of DAC facilities. <p>Measuring the maximum adoption potential of DAC facilities using activity penetration is a complex task that requires a wide range of data sources and</p>
Response from Methodology Developer	We forwarded your comment to VERRA and where they can continuously evaluate adding the standized approach in periodic reviews of the methodology
Aster Global Findings Round 1	- The methodology developers revised additionality to use the project method and not a standardized approach. The standardized approach would use activity penetration.

Item	113
Comment Number	113
Organization	Nystart GmbH
Key Question	6. Is a maximum IRR of 21% appropriate for the risk-return profile for CCS technologies in the coming 5-10 years? What alternative maximum IRR would you suggest and why?

<p>Comment</p>	<p>The appropriateness of a maximum Internal Rate of Return (IRR) of 21% for the risk-return profile of Carbon Capture and Storage (CCS) technologies hinges on a variety of factors. These include the maturity of the technology, market dynamics, policy support, and the nature of the risks involved.</p> <p>As of now, CCS technologies are still developing and involve a fair degree of risk due to uncertainties surrounding technological advancement, policy support, and market acceptance. This high-risk profile might justify a higher IRR to incentivize investment.</p> <p>However, as we look into the future, several factors could influence this number:</p> <ul style="list-style-type: none"> - Technological Advancements: Significant advancements in CCS technologies could reduce costs and risks, leading to a lower IRR. - Policy Support: Strong policy support and incentives could also de-risk CCS projects and thus warrant a lower IRR. - Market Maturity: As the market matures and CCS technologies become more accepted and mainstream, the perceived risk should decrease, which could lead to a lower IRR. <p>Given the current state of CCS technologies and assuming steady advancements and increased policy support, a tentative alternative could be an IRR in the range of 15-18%. However, it's important to regularly reassess this number considering the rapid evolution of the field and the changing market and policy landscape.</p> <p>Please remember, this is a generalized assessment and the appropriate IRR can vary widely based on specific project circumstances, regional factors, and investor risk appetite.</p>
<p>Response from Methodology Developer</p>	<p>Thank you for your feedback. We forwarded your suggestions to VERRA where they can continuously evaluate revising the additionality in periodic reviews of the methodology</p>
<p>Aster Global Findings Round 1</p>	<p>- It is unclear to the assessment team how the developers response takes due account of the comment.</p>
<p>Aster Global Round 1 Findings (NCR/CL/OFI)</p>	<p>1 CL: Please clarify in line with the finding and the original comment</p>

Round 1 Response from Methodology Developer	<p>Please refer to response no 4</p> <p>"The reference for using a 21% Internal Rate of Return (IRR) in the methodology is grounded on industry standards and financial models that reflect the high-risk profile of investments in emerging technologies like CCS. Specifically, this rate is accepted as a proxy for the returns expected from venture capital investments in technologies or business models that share similar risks with the project activities being evaluated. This approach aligns with venture capital practices where a higher IRR is often sought to offset the higher risks associated with pioneering, capital-intensive technologies.</p> <p>The commenter's suggestion of a 15% IRR, while noted, lacks empirical backing or industry reference typical of such methodologies. Therefore, while we recognize the value in reconsidering financial assumptions based on stakeholder feedback, any adjustment to the IRR would require robust supporting data or a shift in industry benchmarks. This comment has been forwarded to VERRA for further review and to ensure that our methodology remains aligned with both industry standards and stakeholder insights."</p>
Aster Global Round 2 Findings (NCR/CL/OFI)	<p>Finding is closed.</p> <p>After the findings were closed, Verra modified the methodology. These changes were driven by Verra requirements, moving guidance to the modules, updating to the current Verra style guide and to align the methodology to the ICVCM.</p>

Item	114
Comment Number	114
Organization	Nystart GmbH
Key Question	7. What types of construction, fabrication or production emissions in DAC projects or other projects may be material to the overall emissions quantification and why?

Comment	<p>Excluding emissions from Capital Expenditure (CAPEX) investments is common practice in Greenhouse Gas (GHG) accounting, often based on the notion that these emissions are 'one-time' or 'sunk' costs, and spread over the lifetime of the project.</p> <p>Emissions from the construction, fabrication, and production phases of a Direct Air Capture (DAC) project should therefore be excluded</p> <p>The focus should primarily be on Operational Expenditure (OPEX) emissions. These would include:</p> <ul style="list-style-type: none"> - Energy Usage: DAC and other carbon capture technologies can be energy-intensive. The emissions associated with the energy source used could have a large impact on the overall emissions profile. If the energy is sourced from fossil fuels, this could lead to substantial emissions. Conversely, sourcing energy from renewables could dramatically reduce emissions. - Chemical Production Emissions: DAC often involves the use of chemicals to capture CO2 from the air. The production of these chemicals, and their subsequent lifecycle, can lead to notable emissions. - Transportation and Storage Emissions: The process of transporting captured carbon to a storage site, as well as the storage process itself, can also contribute to emissions. This includes potential leaks during transportation or storage.
Response from Methodology Developer	Thank you for your feedback and endorsing our approach.
Aster Global Findings Round 1	The methodology development team chose exclude construction emissions and to include energy, chemical, and transportation/storage emissions in the quantification procedures which is in line with the commenters suggestion.

Item	115
Comment Number	115
Organization	Nystart GmbH
Key Question	8. What risks would purpose-built green PPAs pose to credit integrity? How could these be managed? Are there existing standards, regulations, or other sources that provide guidance related to accounting emission benefits of purpose-built green PPAs?
Comment	<ul style="list-style-type: none"> - Double Counting: The biggest risk to credit integrity is the possibility of double counting. This can occur if the emission reductions from the green PPA are claimed by both the buyer (as reduced Scope 2 emissions) and the seller (as carbon credits). This can be managed by clear and transparent accounting and ensuring that there is a robust tracking mechanism in place. The buyer and seller must have a clear agreement about who has the right to claim the carbon reduction benefits. - Additionality: Another risk is the question of additionality, i.e., whether the renewable energy project would have been realized without the specific PPA. It is important to evaluate the financial and market conditions to ascertain whether the PPA played a critical role in enabling the project.
Response from Methodology Developer	VERRA published Electricity tool for PPAs. We forwarded your comments to VERRA.

Aster Global Findings Round 1	- The question posed by verra relates to a verra published electricity tool for PPAs, the development team took due account of the commenters response by passing the information to Verra.
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Item	116
Comment Number	116
Organization	Nystart GmbH
Key Question	9. Is a simplified approach to quantifying small transport emission segments appropriate and why? Are the thresholds and emission intensities proposed appropriate? If not, please explain why and include alternatives with data sources.
Comment	<p>A simplified approach to quantifying small transport emission segments could be deemed appropriate for the sake of operational feasibility and cost-effectiveness, especially in contexts where detailed data gathering is challenging or resource-intensive. However, it's essential to note that simplification should not compromise the integrity of the overall carbon accounting.</p> <p>Here's why this approach might be reasonable:</p> <ul style="list-style-type: none"> - Operational Feasibility: Detailed emissions accounting can be complex and resource-intensive. In cases where transport emissions represent a minor segment of a project's total emissions, a simplified approach can be a more practical solution. - Cost-effectiveness: Comprehensive tracking and monitoring of small transport emission segments could be costly relative to the emissions' impact. A simplified methodology may offer a more cost-effective approach. <p>The appropriateness of thresholds and emission intensities depends on their alignment with real-world data and scenarios. It's crucial that they are set based on reliable data sources and regularly reviewed to ensure they continue to reflect actual emissions accurately.</p> <p>Regarding alternatives, a possible approach could involve the use of sector or region-specific emission factors. Such factors could be derived from authoritative sources like the Intergovernmental Panel on Climate Change (IPCC) Guidelines for National Greenhouse Gas Inventories, or from national databases where available.</p> <p>As always, the overarching principle should be maintaining the integrity of carbon accounting practices. A simplified approach should be scientifically robust, transparent, and result in a conservative estimate of emissions.</p>
Response from Methodology Developer	Thank you for endorsing our approach.
Aster Global Findings Round 1	- The methodology development team chose to use a simplified approach to quantifying transportation emissions which is in line with the commenters suggestion.

Item	117
Comment Number	117
Organization	Nystart GmbH

Key Question	10. What differences in monitoring and long-term risk of reversals exist between storage in saline aquifers and depleted oil and gas reservoirs? Do you think requirements would be different enough to justify having separate modules? Why or why not?
Comment	<p>- Saline Aquifers: Saline aquifers are underground formations filled with brackish water or brine, and are much more abundant and widely distributed than depleted oil and gas reservoirs. The primary challenge with saline aquifers is that they are often less well-characterized than depleted reservoirs, leading to increased uncertainty regarding their capacity, injectivity, and containment security. The risk of CO2 leakage can be higher due to less knowledge about the caprock integrity. Long-term monitoring requires comprehensive analysis and predictive modeling to ensure the aquifer's integrity and the stored CO2's stability.</p> <p>- Depleted Oil and Gas Reservoirs: Depleted oil and gas reservoirs are better understood and characterized due to their previous use for hydrocarbon extraction. They often have known and reliable caprocks. However, they may pose risks associated with old wells that might act as leakage pathways, which requires careful well management and abandonment procedures. Depleted reservoirs are less widespread than saline aquifers and are often located in areas with established infrastructure and legal and regulatory frameworks.</p> <p>Given these differences, there could be justification for separate modules when it comes to monitoring and managing long-term risks. The factors like the level of characterization, geographic distribution, and potential leakage pathways differ significantly, meaning the best practices for monitoring and risk management may also vary.</p> <p>However, creating separate modules should be weighed against the potential increase in complexity and fragmentation of the CCS regulations and guidelines. If the essential principles for risk management and monitoring can be universally applied, a unified approach might still be feasible and more manageable. The key is to ensure that any approach sufficiently accounts for the differences and risks associated with each storage type.</p>
Response from Methodology Developer	Thank you for your feedback. An updated storage module that covers both storage options is being developed. VMD00XX: Module for CO2 Storage in Saline Aquifers and Depleted Hydrocarbon Reservoirs
Aster Global Findings - Round 1	The referenced module is not yet complete, and future references cannot be assessed. The Assessment team notes that the referenced module appears to be a reasonable location to address the commentors concern.

Item	118
Comment Number	118
Organization	BMO Radicle
Key Question	1. Can emissions reductions and CDR be addressed under a single framework methodology, or should there be a stand-alone framework methodology for removals? Why or why not?

Comment	Yes. Consideration should be given to PPA treatment for DAC, but that does not mean there must be a separate document. If it is applicable the PPA treatment should be addressed if it is not applicable then consider it NA. The activities are similar enough the document can be one that includes all SSR conceivable for all types. The expectation is that many would be not applicable and labeled as such on a project plan
Response from Methodology Developer	VERRA published Electricity tool for PPAs. In response to CDRs, we are developing the VT00XX: Tool for Differentiating Reductions and Removals in CCS Projects. This tool is designed to provide clear guidance and procedures for accurately distinguishing between reductions and removals, catering specifically to the diverse nature of CCS projects. It will address the fundamental differences and operational nuances between these two categories, ensuring accurate reporting and prevention of double-counting. Your feedback is forwarded to VERRA and CCS+ secretariat for their consideration.
Aster Global Findings Round 1	The development team took due account by developing a specific tool to provide guidance on how project proponents must handle the accounting of reductions and removals. The referenced Tool is not yet complete, and future references cannot be assessed. The Assessment team notes that the referenced tool appears to be a reasonable location to address the commentors suggestion.

Item	119
Comment Number	119
Organization	BMO Radicle
Key Question	2. Given the high capital cost and long investment horizon of CCS projects, do you think a project approach or standardized approach is more appropriate for assessing additionality? Why?
Comment	Standardized approach is needed. I believe a common practice and adoption rate threshold are the key determining factors of additionality for this project type. An investment analysis can be requested. However as per the CDM tool for additionality, even a project with favorable economics can be considered additional if there are technical barriers and if it is not common practice. I believe taking a positives list approach for this project type and monitoring adoption rate makes more sense and adheres to the CDM tool and international standards. Additionally the competition of capital is real (from investors perspective and from internal corporate perspective) Also carbon market confidence is a real barrier to attract institutional investors which may not be adequately assessed in the investment analysis

Response from Methodology Developer	<p>Thank you for your insights on the necessity of a standardized approach for assessing additionality in Carbon Capture and Storage (CCS) projects. While we understand the appeal of a uniform methodology, such as the one suggested through a positive list approach and monitoring adoption rates, we maintain our preference for a project-based approach due to the unique characteristics and challenges of each CCS project.</p> <p>The project-based approach allows for a nuanced and thorough consideration of each project's specific context, including its technological, financial, and operational barriers, which a standardized method might overlook. This tailored assessment is crucial because:</p> <p>Tailored Evaluations: CCS projects operate in varied regulatory, technological, and market environments, requiring customized assessments to accurately identify additionality.</p> <p>Investment and Technology Considerations: The high capital requirements and diverse technologies across CCS projects necessitate a detailed analysis of financial and technological barriers, which the Project Method provides.</p> <p>Adaptability: The dynamic nature of the CCS sector, with evolving policies and market conditions, calls for an adaptable assessment method like the Project Method to ensure accurate and current evaluations.</p> <p>We forwarded your comment to VERRA and where they can continuously evaluate adding the standardized approach in periodic reviews of the methodology</p>
Aster Global Findings Round 1	<p>The methodology development teams response took due account of the comment by explaining the rational behind moving forward with the project method for additionality. Specifically, a project method allows for more flexibility to address technology/financial challenges, and will be more adaptable to the varied regulatory landscapes project proponents will face.</p>

Item	120
Comment Number	120
Organization	BMO Radicle
Key Question	3. Should a standardized approach using activity penetration be used for assessing additionality for particular project types or capture technologies (such as DAC or other CDR technologies) instead of the project approach using investment analysis? Why or why not?
Comment	Yes. For the reasons described above including attracting institutional investors

Response from Methodology Developer	<p>We recognize the advantages of a standardized approach, particularly in reducing administrative burdens. However, after careful consideration, we've chosen the Project Method due to the unique complexities of CCS projects:</p> <p>Tailored Evaluations: CCS projects operate in varied regulatory, technological, and market environments, requiring customized assessments to accurately identify additionality.</p> <p>Investment and Technology Considerations: The high capital requirements and diverse technologies across CCS projects necessitate a detailed analysis of financial and technological barriers, which the Project Method provides.</p> <p>Adaptability: The dynamic nature of the CCS sector, with evolving policies and market conditions, calls for an adaptable assessment method like the Project Method to ensure accurate and current evaluations.</p> <p>We forwarded your comment to VERRA and where they can continuously evaluate adding the standized aprach in periodic reviews of the methodology</p>
Aster Global Findings Round 1	The methodology development teams response took due account of the comment by explaining the rational behind moving forward with the project method for additionality. Specifically, a project method allows for more flexibility to address technology/financial challenges, and will be more adaptable to the varied regulatory landscapes project proponents will face.

Item	121
Comment Number	121
Organization	BMO Radicle
Key Question	4. When establishing a positive list (activity penetration) for assessing additionality, how would the maximum adoption potential of DAC or other capture technologies be measured? What data sources might inform this?
Comment	Max adoption potential could be measured based on provincial and or state emission inventories delineated by sources that could possibly be captured. DAC will only commercialize broadly if there is a carbon credit as revenue since there is not another product/revenue source. DAC should be considered additional by nature of the business model, so allows on the positives list. Additionality could be based on one question about revenue sources from the project.
Response from Methodology Developer	We forwarded your comment to VERRA and where they can continuously evaluate adding the standized aprach in periodic reviews of the methodology
Aster Global Findings Round 1	The methodology developers revised additionality to use the project method and not a standardized approach. The standardized approach would use activity penetration.

Item	122
Comment Number	122
Organization	BMO Radicle
Key Question	5. When assessing additionality using activity penetration, how would the maximum adoption potential of DAC facility be measured? What data sources might inform this?
Comment	See above

Response from Methodology Developer	NA
Aster Global Findings Round 1	- The initial comment does not have enough information for the methodology development team to properly respond.

Item	123
Comment Number	123
Organization	BMO Radicle
Key Question	6. Is a maximum IRR of 21% appropriate for the risk-return profile for CCS technologies in the coming 5-10 years? What alternative maximum IRR would you suggest and why?
Comment	This number seems arbitrary and may not reflect competition for capital for any given project. Also does not address the risks that a project must overcome. It is conceivable that a project with 21% IRR is deemed too risky to proceed due to a variety of factor - carbon market uncertainty, lack of qualified resources, lack of infrastructure, institutional inertia
Response from Methodology Developer	Thank you for your feedback. We forwarded your suggestions to VERRA where they can continuously evaluate revising the additionality in periodic reviews of the methodology
Aster Global Findings Round 1	- It is unclear to the assessment team how the developers response takes due account of the comment.
Aster Global Round 1 Findings (NCR/CL/OFI)	1 CL: Please clarify in line with the finding and the original comment
Round 1 Response from Methodology Developer	Please refer to response no 4 "The reference for using a 21% Internal Rate of Return (IRR) in the methodology is grounded on industry standards and financial models that reflect the high-risk profile of investments in emerging technologies like CCS. Specifically, this rate is accepted as a proxy for the returns expected from venture capital investments in technologies or business models that share similar risks with the project activities being evaluated. This approach aligns with venture capital practices where a higher IRR is often sought to offset the higher risks associated with pioneering, capital-intensive technologies. The commenter's suggestion of a 15% IRR, while noted, lacks empirical backing or industry reference typical of such methodologies. Therefore, while we recognize the value in reconsidering financial assumptions based on stakeholder feedback, any adjustment to the IRR would require robust supporting data or a shift in industry benchmarks. This comment has been forwarded to VERRA for further review and to ensure that our methodology remains aligned with both industry standards and stakeholder insights."
Aster Global Round 2 Findings (NCR/CL/OFI)	2 Finding is closed. After the findings were closed, Verra modified the methodology. These changes were driven by Verra requirements, moving guidance to the modules, updating to the current Verra style guide and to align the methodology to the ICVCM.

Item	124
Comment Number	124
Organization	BMO Radicle

Key Question	7. What types of construction, fabrication or production emissions in DAC projects or other projects may be material to the overall emissions quantification and why?
Comment	Chemicals, solvents, steel, metals, well drilling, well testing
Response from Methodology Developer	Thank you for your feedback. Embodied emissions from energy consumption and material use are included in the quantification procedures.
Aster Global Findings Round 1	The methodology development team chose to include energy, chemical, and transportation/storage emissions in the quantification procedures which is in line with the commenters suggestion, but it is unclear to the assessment team how the response addresses the commenters suggestion to include emissions from steel/metal/well drilling/well testing.
Aster Global Round 1 Findings (NCR/CL/OFI)	CL: Please clarify in line with the finding and the original comment
Round 1 Response from Methodology Developer	Please refer to response no 2. "Materials used in the construction are considered to be minor sources of emissions and are therefore excluded for simplicity in the emissions quantification process. This is also can be checked by the academic papers that discusses the LCA for CO2 capture. Both papers show that construction emissions are minor. 1-Liu, Caroline M.; Sandhu, Navjot K.; McCoy, Sean T.; Bergerson, Joule A. (2020): A life cycle assessment of greenhouse gas emissions from direct air capture and Fischer-Tropsch fuel production, in Sustainable Energy and Fuels, 4(6), p. 3129–3142. 2-de Jonge, Melinda M. J.; Daemen, Juul; Loriaux, Jessica M.; Steinmann, Zoran J. N.; Huijbregts, Mark A. J. (2019): Life cycle carbon efficiency of Direct Air Capture systems with strong hydroxide sorbents, in International Journal of Greenhouse Gas Control, 80, p. 25–31. "
Aster Global Round 2 Findings (NCR/CL/OFI)	Finding is closed.

Item	125
Comment Number	125
Organization	BMO Radicle
Key Question	8. What risks would purpose-built green PPAs pose to credit integrity? How could these be managed? Are there existing standards, regulations, or other sources that provide guidance related to accounting emission benefits of purpose-built green PPAs?
Comment	This is a hard question! Not sure I have the answer formulated fully yet. Stay tuned as the Canada federal DAC protocol TET are wrestling this issue, also.
Response from Methodology Developer	VERRA published Electricity tool for PPAs. We forwarded your comments to VERRA.
Aster Global Findings Round 1	The question posed by verra relates to a verra published electricity tool for PPAs, the development team took due account of the commenters response by passing the information to Verra.

Item	126
Comment Number	126
Organization	BMO Radicle

Key Question	9. Is a simplified approach to quantifying small transport emission segments appropriate and why? Are the thresholds and emission intensities proposed appropriate? If not, please explain why and include alternatives with data sources.
Comment	It depends on the size of the project from a materiality perspective. For most it is likely appropriate, but perhaps project size could be specified to ensure material emissions have not be excluded
Response from Methodology Developer	Thank you for endorsing our approach.
Aster Global Findings Round 1	It is unclear to the assessment team how the developers response properly addresses the commenters suggestion to include project size as a parameter when determining if default values are appropriate.
Aster Global Round 1 Findings (NCR/CL/OFI)	CL: Please clarify in line with the finding and the original comment
Round 1 Response from Methodology Developer	Materiality threshold based on the percentage of the removals therefore size of the project activity. Methodology developers approach inherently considers the size of the project activity.
Aster Global Round 2 Findings (NCR/CL/OFI)	Finding is closed.

Item	127
Comment Number	127
Organization	BMO Radicle
Key Question	10. What differences in monitoring and long-term risk of reversals exist between storage in saline aquifers and depleted oil and gas reservoirs? Do you think requirements would be different enough to justify having separate modules? Why or why not?
Comment	If it is possible for the lease on a depleted well to be sold, then perhaps it should be treated differently and with a separate module
Response from Methodology Developer	Thank you for your feedback. An updated storage module that covers both storage options is being developed. VMD00XX: Module for CO2 Storage in Saline Aquifers and Depleted Hydrocarbon Reservoirs
Aster Global Findings Round 1	The referenced module is not yet complete, and future references cannot be assessed. The Assessment team notes that the referenced module appears to be a reasonable location to address the commentors concern.

Item	128
Comment Number	128
Organization	Heidelberg Materials
Key Question	1. Can emissions reductions and CDR be addressed under a single framework methodology, or should there be a stand-alone framework methodology for removals? Why or why not?
Comment	<p>The technologies of DAR and CCS are different technologies, as such the two technologies should be treated differently and separately. Therefore, there should be stand-alone framework for methodology removals.</p> <p>Additionally, framework wise, lifecycle assessment should be thought about. Scope emissions should also be clearly defined (scope 1 to scope 3), should be clear.</p> <p>BECCS should also have a clear definition with separate methodology.</p>

Response from Methodology Developer	In response, we are developing the VT00XX: Tool for Differentiating Reductions and Removals in CCS Projects. This tool is designed to provide clear guidance and procedures for accurately distinguishing between reductions and removals, catering specifically to the diverse nature of CCS projects. It will address the fundamental differences and operational nuances between these two categories, ensuring accurate reporting and prevention of double-counting. Your feedback is forwarded to VERRA and CCS+ secretariat for their consideration.
Aster Global Findings Round 1	The development team took due account by developing a specific tool to provide guidance on how project proponents must handle the accounting of reductions and removals. The referenced Tool is not yet complete, and future references cannot be assessed. The Assessment team notes that the referenced tool appears to be a reasonable location to address the commenters suggestion.

Item	129
Comment Number	129
Organization	Heidelberg Materials
Key Question	2. Given the high capital cost and long investment horizon of CCS projects, do you think a project approach or standardized approach is more appropriate for assessing additionality? Why?
Comment	For assessing additionality, due to the complexity, differences, location and many other variables, a project to project approach is best. There is no one size fits all or off the shelf solution for each project due to complexity and variability. For example some project have a combined heat and power, others may not have that. The combined heat and power reduces scope 2 emissions (which will also be captured), while other may not do the same.
Response from Methodology Developer	Thank you for endorsing the project-based approach to assessing additionality in Carbon Capture and Storage (CCS)
Aster Global Findings Round 1	The methodology development team chose to use a project-based approach for determining additionality which is in line with the commenters suggestion.

Item	130
Comment Number	130
Organization	Heidelberg Materials
Key Question	3. Should a standardized approach using activity penetration be used for assessing additionality for particular project types or capture technologies (such as DAC or other CDR technologies) instead of the project approach using investment analysis? Why or why not?
Comment	A project approach should be used, however, the major focus should be put on environmental additionality.
Response from Methodology Developer	Thank you for endorsing the project-based approach to assessing additionality in Carbon Capture and Storage (CCS).
Aster Global Findings Round 1	The methodology development team chose to use a project-based approach for determining additionality which is in line with the commenters suggestion.

Item	131
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Comment Number	131
Organization	Heidelberg Materials
Key Question	4. When establishing a positive list (activity penetration) for assessing additionality, how would the maximum adoption potential of DAC or other capture technologies be measured? What data sources might inform this?
Comment	There should be no limit based on activity penetration for foreseeable future. Additionality should be based on whether emissions occur in the baseline scenario in the absence of the activity.
Response from Methodology Developer	We forwarded your comment to VERRA and where they can continuously evaluate adding the standardized approach in periodic reviews of the methodology
Aster Global Findings Round 1	- The methodology developers revised additionality to use the project method and not a standardized approach. The standardized approach would use activity penetration.

Item	132
Comment Number	132
Organization	Heidelberg Materials
Key Question	5. When assessing additionality using activity penetration, how would the maximum adoption potential of DAC facility be measured? What data sources might inform this?
Comment	Not applicable.
Response from Methodology Developer	NA
Aster Global Findings Round 1	- The initial comment does not have enough information for the methodology development team to properly respond.

Item	133
Comment Number	133
Organization	Heidelberg Materials
Key Question	6. Is a maximum IRR of 21% appropriate for the risk-return profile for CCS technologies in the coming 5-10 years? What alternative maximum IRR would you suggest and why?
Comment	The alternative maximum IRR should be dependent on current and future carbon prices.
Response from Methodology Developer	the use of a benchmark IRR in the context of carbon credit methodologies is intended to ensure that projects which receive carbon credits are those that would not have been financially viable without this additional carbon income, therefore carbon prices do not play a role in the IRR analysis.
Aster Global Findings Round 1	- The development teams response takes due account of the comment by clarifying that carbon prices are not relevant to the benchmark IRR, which is intended to ensure funding for projects that would not be financially viable without the additional carbon income. After the findings were closed, Verra modified the methodology. These changes were driven by Verra requirements, moving guidance to the modules, updating to the current Verra style guide and to align the methodology to the ICVCM.

Item	134
Comment Number	134

Organization	Heidelberg Materials
Key Question	7. What types of construction, fabrication or production emissions in DAC projects or other projects may be material to the overall emissions quantification and why?
Comment	<p>For overall emission quantification of construction and fabrication: This would be handled by the local market as one time emissions. For example carbon price for the scope 3 emissions during construction/</p> <p>For overall production emissions: This should be distinctly different. Local market will allow payment for CO2 emissions during use (during production). Whatever emission are not covered by local market, for example when the project/job is complete, if not covered by local market then offset reductions should be done. Emissions during production need to be considered, as long as pluses and minuses are looked after you can look at true additionality.</p>
Response from Methodology Developer	Thank you for your feedback. Embodied emissions from energy consumption and material use are included in the quantification procedures.
Aster Global Findings Round 1	The methodology development team chose exclude construction emissions and to include energy, chemical, and transportation/storage emissions in the quantification procedures which is in line with the commenters suggestion.

Item	135
Comment Number	135
Organization	Heidelberg Materials
Key Question	8. What risks would purpose-built green PPAs pose to credit integrity? How could these be managed? Are there existing standards, regulations, or other sources that provide guidance related to accounting emission benefits of purpose-built green PPAs?
Comment	Any reductions must actually be materialized and not done through PPAs. This is for any scope emissions.
Response from Methodology Developer	VERRA published Electricity tool for PPAs. We forwarded your comments to VERRA.
Aster Global Findings Round 1	The question posed by verra relates to a verra published electricity tool for PPAs, the development team took due account of the commenters response by passing the information to Verra.

Item	136
Comment Number	136
Organization	Heidelberg Materials
Key Question	9. Is a simplified approach to quantifying small transport emission segments appropriate and why? Are the thresholds and emission intensities proposed appropriate? If not, please explain why and include alternatives with data sources.
Comment	For quantifying small transport, simplified approach for industrial emitters is appropriate. There needs to be room to allow emitters to use facility specific factors. If small transport emissions are already accounted as part of a carbon system and as part of the carbon accounting for the facility, this should be considered complete. The small transport emissions should not be counted twice.

Response from Methodology Developer	Thank you for endorsing our approach.
Aster Global Findings Round 1	- The methodology development team chose to use a simplified approach to quantifying transportation emissions which is in line with the commenters suggestion.

Item	137
Comment Number	137
Organization	Heidelberg Materials
Key Question	10. What differences in monitoring and long-term risk of reversals exist between storage in saline aquifers and depleted oil and gas reservoirs? Do you think requirements would be different enough to justify having separate modules? Why or why not?
Comment	Not applicable.
Response from Methodology Developer	NA
Aster Global Findings Round 1	- There is not enough information in the original comment for the methodology developer to take due account of.

11 APPENDIX E: VERRA METHODOLOGY REVIEW REPORT

METHODOLOGY REVIEW REPORT – BATCH 1

Methodology Name	Methodology for Carbon Capture and Storage
Version of review report	2.0
New Methodology or Revision	New Methodology and Modules
Methodology Developer	CCS+ Initiative
Program(s)	VCS
Sectoral Scope(s)	Carbon Capture and Storage

Assessment Criteria	VCS Standard v4.1
Date of First Issue	10 October 2021
Date of Second Issue	21 January 2022
Date of Third Issue	14 April 2023
Date of Final Issue	26/06/2023

Summary

We have reviewed the methodology in accordance with the latest VCS Program rules and requirements, specifically the [VCS Standard v4.4](#), the [VCS Methodology Requirements, v4.3](#) and the [VCS Methodology Development and Review Process, v4.2](#).

The review has raised a number of key findings, detailed below. We ask the methodology developer to provide a response to the findings presented in Section 1. We also include further findings directly as comments in the methodology. All these assessment findings must be addressed to the satisfaction of Verra in order for the proposed methodology to proceed to the next stage of the methodology development process.

Please note that further findings can be added during subsequent review rounds and previously findings may be re-opened, if necessary.

1. REVIEW FINDINGS

Finding 1 – Project Boundary - closed

Finding 1	
<p>Summary of finding: Project Boundary</p> <p>Reference: (General)</p> <p>Type of findings: Action Request</p>	
Description of finding	Date: 10/10/2021
<p>The project boundary is not clearly defined. The methodology is not specific and the modules provide varying levels of detail on where the module boundaries start and stop. In particular:</p> <ul style="list-style-type: none"> a. Allowance of multiple storage reservoirs – Due to the long term risk management and monitoring required for each storage site, and the need for risk assessment and buffer credits associated with each storage site, it is not clear how a project can have more than one storage reservoir (note: this is different than a storage reservoir having multiple injection sites). Projects can be grouped (multiple storage sites connected with a pipeline) but each instance of a grouped project must meet all criteria in the methodology. Project boundaries can be expanded to include more capture sites. b. Cogens – For cogeneration of steam and electricity used in the capture module, there are many ways in which this could be mis-used. Cogens that are connected via the grid should use the grid factor not a cogen specific factor. Understanding what the steam was used for in the baseline condition can be important and may require that the cogen unit be in the project boundary. Much more description and guidance on cogeneration energy is required, including whether the cogen is in the project boundary and justification / explanation for why it is out (it appears to be out of the boundary as written now). 	
Methodology Developer Response	Date: 22/11/2021
<ul style="list-style-type: none"> (a) Further explanation with regard to the definition of project boundary for pre-combustion & oxy-fuel capture has been provided in Module-2.2-Combustion. It is further described that only the facilities that are added on top of the original production processes to facilitate capture activities are included inside the project boundary. (b) It was discussed with Verra that having multiple storage sites for one project is technically possible and allowed under the methodology if all storage sites passed the risk assessment outlined in the NPRT, this is however unlikely and might pose burdens in the registration process. A further alignment call will be requested to clarify this for the next version of the methodology. (c) Section 8.3.3 indicates that project emissions from heat consumption should be accounted following <i>CDM Tool 05: Baseline, project and/or leakage emissions from</i> 	

<p><i>electricity consumption and monitoring of electricity generation</i>. This tool provides provisions in case of plants that cogenerate heat and power</p>	
Verra Assessment	Date: 21/01/2022
<p>(a) Finding closed</p> <p>(b) We do not think that it would be practical to have multiple storage sites in the same project activity. For examples, the NPRT assigns risk scores to a project, but it is not clear how risk scores can be combined.</p> <p>(c) Section 8.3.3 does not reference CDM tool 5.</p>	
Methodology Developer Response	Date: 10/02/2023
<p>(b) This has been addressed in the latest version of GCS requirements</p> <p>(c) The equations for quantification of project emissions are now moved to modules. References are added to modules accordingly.</p>	
Verra Review Team Response	Date: 14/04/2023
<p>(b) Finding closed.</p> <p>(c) Finding closed.</p> <p>Further, the following findings related to the project boundary must be addressed (relevant for methodology and certain modules):</p> <ol style="list-style-type: none"> (1) Table 2 methodology: the overview of general emission sources is good. Please include before the table a clarification that the detailed sources and sinks are provided in the modules (2) Tables 2 should not use “emissions from...” This column includes the sources. Emissions are not a sources, but the result of the source. Also include other changes and simplifications as per the following points. For example: <ol style="list-style-type: none"> a. “Emissions from fuel consumption (upstream fuel supply and onsite combustion), may include emissions from the co-generation of electricity and heat” could be simplified to “Onsite energy generation”, which may include electricity generation, heat, and co-generation based on fossil fuels. Or “Embodied emissions from the consumption of chemicals (e.g. sorbents, solvents)” <p>Further details are provided in the GHG quantification. It is not required to be overly detailed here, as long as all relevant sources are included.</p> (3) “Emissions from electricity consumption (including upstream generation and transport emissions), may include emissions from the co-generation of electricity and heat”: it is unclear whether this refers to onsite generation of electricity or grid electricity consumption or both. If this only refers to grid-electricity, it is unclear why co-generation is also included here. (4) Several sources refer to “including upstream generation and transport emission” and “upstream fuel supply and onsite combustion”. This can be deleted (details do not need to be included here, but in the GHG quantification section). Also, transport of electricity is not an emission source, but may lead to losses that required to be accounted for (GHG quantification, not boundary). (5) Some modules include “co-generation of electricity and heat” in multiple sources (e.g., electricity consumption, fuel consumption). Sources must not be repeated. Please 	

<p>correct.</p> <p>(6) Use of “embodied emissions”, refer to Finding 19.</p> <p>(7) The modules list several sources in the table that are fully excluded, for example “Emissions related to the manufacturing of fuel and electricity generation infrastructure (i.e., vehicles, boilers, power transmission lines, power plant construction emissions)”. Delete all such sources not included in the boundary.</p>	
Verra Developer Team Response	Date: 14/04/2023
For PCG	
Methodology Developer Response	Date: 09/06/2023
<p>(1) Suggestion has been followed and text has been added above Table 2.</p> <p>(2) Description in Table 2 has been revised to reflect “sources”. Details have been removed as suggested.</p> <p>(3) Reference to co-generation removed from Table 2 and approach further refined in quantification sections considering revisions proposed by Verra Developer Team.</p> <p>(4) Upstream emissions removed from Table 2 and addressed in leakage as proposed by Verra Developer Team.</p> <p>(5) Table 2 has been revised accordingly. See also response under #2 above.</p> <p>(6) Term embodied emissions has been removed from Table 2.</p> <p>(7) Emission sources excluded are removed from Table 2.</p>	
Verra Review Team Response	Date: 14/06/2023
All findings are closed.	

Finding 2 – Additionality – closed (FAR)

Finding 2	
Summary of finding: Additionality	
Reference: Section 7, methodology	
Type of findings: Action Request	
Description of finding	Date: 10/10/2021
<p>The activity penetration analysis in Appendix A of the methodology document does not sufficiently characterize the maximum adoption potential (MAP_y) term. Among potentially others, the implementation potential as described in Section 3.5.9 - 1) iv) of the Methodology Requirements has not been considered. A global analysis of industrial emissions sources considering their feasible proximity to storage sites would be appropriate to demonstrate the MAP_y.</p> <p>The positive list approach does not distinguish projects that generate revenue, so this additional criteria within the positive list approach would be unnecessary.</p>	

The Investment Analysis proposed does not meet the requirements of the Project Method described in section 3.5.3 of the Methodology Requirements. Proponents must demonstrate their project faces a barrier and conduct a common practice analysis. Guidance on how to account capital expenditures and revenues / savings is insufficient. The methodology does not describe the common practice analysis.

Methodology Developer Response **Date:** 22/11/2021

A new approach to additionality assessment has been developed. In the new approach, project proponents can employ activity method (positive list: revenue streams) or, when positive list is not applicable, project method to assess additionality. The detailed steps for additionality assessment are presented in ‘*Methodology for Carbon Capture and Storage*’ and the tool ‘*VT00XX Revenue Stream Method for Demonstration of Additionality for Carbon Capture and Storage Projects*’.

Verra Assessment **Date:** 21/01/2022

The module with the activity method based on the revenue stream option (version 2) still has several issues, e.g.

- 1) Only the first of potentially many capture projects can apply this option, since the tool assumes that all investment costs are allocated to the first project. Limiting to the first project only is not in the spirit of a standardized method and assuming that the initial investment costs are fully attributable to the first capture project is reasonable
- 2) Only projects with no revenues at all would apply, although the methodology requirements provide a 5% threshold. A project with minimal revenues should also be applicable as per the requirements to not further limit the applicability of the standardized method.
- 3) It is still not clear how different cash flows within the project boundary (e.g. between capture, transport and storage facilities) and such cash flows from outside the boundary should be dealt with. It is not clear what are “revenues” for the project activity.
- 4) It is not clear how “grants” for initial development are treated. Probably they do not require to be accounted for as “revenues” since they only alleviate initial investment, but do not contribute to operational “revenues”.
- 5) As currently proposed, this tool would only be applicable outside of US, EU, Canada and Norway. The GCS requirements indicate that the project must occur in a jurisdiction where clear CCS regulation is in place. This means this tool would only apply in locations where GCS projects are not yet eligible.

We consider that the activity penetration option would provide a simplified option more suitable than the revenue stream option and would also completely avoid the use of the project method, which is a preference of Verra for new methodologies

Methodology Developer Response **Date:** 10/02/2023

- The project method based on investment analysis is used in the current version of

<p>methodology. In addition, additional specific guidance is provided on the following aspects:</p> <ul style="list-style-type: none"> ○ Investment analysis reflecting multiple participants involved in the project activities ○ Investment analysis reflecting third-party involvement in CCS+ project activities ○ Investment analysis reflecting non-VCS CO2 included in CCS+ project activities ○ Investment analysis guidance reflecting risk and uncertainty of CCS+ ○ Operating and maintenance costs 	
Verra Review Team Response	Date: 14/04/2023
<p>The current draft includes the Investment Analysis, but the decision on whether to use an Investment Analysis or standardized method is still pending. This will be put to consideration for the public stakeholder consultation with specific questions to support the final decision.</p> <p>Further findings on the draft guidance and rules for investment analysis are included in Finding 15.</p> <p>This finding remains open and will be further addressed after the public stakeholder consultation.</p>	
Verra Developer Team Response	Date: 14/04/2023
<p>This finding remains open at this time and will be informed by the feedback from public consultation.</p>	
Methodology Developer Response	Date: 09/06/2023
<p>Agree to revisit based on feedback from public consultation</p>	
Verra Review Team Response	Date: 14/06/2023
<p>Forward action requests:</p> <ol style="list-style-type: none"> 1. PCG to revisit this finding after the public stakeholder consultation. 2. Consider what IRR cap is appropriate given 25% was changed to 21% 3. Consider a cap on the contingency costs option 3 – 15% for example (this was included in public consultation actually) 	

Finding 3 – Applicability Conditions - closed

Finding 3	
Summary of finding: Applicability Conditions	
Reference: Section 4 – methodology, DAC module, transport module, aquifer storage module	
Type of findings: Action Request and Clarification	
Description of finding	Date: 10/10/2021

Action Request: The applicability conditions are not well coordinated across the methodology / modules, sometimes repetitive and not seemingly addressing concerns in other areas of the documents (measurement, additionality, etc).

Clarification: Several of the applicability conditions from the non-permanence risk tool (draft) may be better suited to the methodology. Verra would insert them after discussion with the proponent.

Methodology Developer Response

Date: 22/11/2021

Alignment on applicability conditions has been done across the methodology and modules. Please see sections 4.1 and 4.2 of the *'Methodology for Carbon Capture and Storage'*

Verra Assessment

Date: 21/01/2022

The updates of the applicability conditions have been reviewed. The following applicability conditions require further revision or update:

- 1) **Module 3.2 – CO2 Transport via Ships** – “CO2 is transported via ships liquified or at any other conditions as per available technology”.

Please clarify this condition. If the only real condition is that the CO2 has to be transported via ships for this module to be applicable, remove “at any other conditions as per available technology”

Methodology Developer Response

Date: 10/02/2023

All the previous transport modules have been combined into a single consolidated transport module that covers pipeline, ship, railway, and trucks. The applicability conditions have also been revised accordingly.

Verra Review Team Response

Date: 14/04/2023

Please review the VCS Methodology Requirements, v4.3, section 3.2.2: “Applicability conditions must be specified clearly, and in a manner that allows easy determination of whether an activity being undertaken by a potential project proponent is eligible.”

Methodology:

- 1) This applicability condition is unclear: “Reduce energy-related emissions through technology improvement, operational improvement, a shift in the mode of transportation, or a switch to less carbon-intensive energy sources (however, a registered project may improve its energy performance resulting in lower project emissions);” Eligible project activities are already defined as “activities that capture CO2 from point sources or directly from the atmosphere and store it safely and permanently in geological formations.” **-Closed pending whether Developer (CCS+) accepts Verra edits**

<p>2) It is not clear which activities might be ineligible due to this applicability condition: “The energy performance of a source facility decreases after the implementation of a capture activity, below an expected level, as a result of self-supplied energy (e.g., use of heat or electricity for the capture facility).” -Closed pending whether Developer (CCS+) accepts Verra edits</p> <p>Storage Module:</p> <p>3) “The mandatory monitoring point(s) for CO2 injection is...” VCS Methodology Requirements, v4.3, section 3.2.3: “Applicability conditions must not contain procedures or obligations upon the project proponent. Rather, they must be conditions against which project eligibility can be determined at the time of validation and must not require the project proponent to undertake ongoing actions to ensure continued eligibility.” The location of the monitoring point(s) is not an appropriate applicability condition, since any project could update it’s design and move the monitoring point if it wasn’t originally designed to meet this criteria. This content is more appropriate to include along with other monitoring requirements (Section 8.1 of the aquifers module).</p> <p>What is the mandatory monitoring point(s)? I don’t see this defined, isn’t this something that should be a monitoring requirement? How do you decide a project is eligible or not based on this? Is it trying to say that if they don’t have a certain type of monitoring equipment built into the design or installed that meets these conditions? -Closed pending whether Developer (CCS+) accepts Verra edits</p>	
<p>Verra Developer Team Response Date: 14/04/2023</p>	
<p>Methodology</p> <p>1) text revised for clarification. This point is important to ensure it is clear that projects activities that are eligible per point 1 of the applicability conditions do not include the improvements listed per this exclusion.</p> <p>2) text removed</p> <p>Storage Module:</p> <p>3) The applicability condition has been altered to remove the details of the mandatory monitoring points. These have been moved to section 8.3. The intent is that project eligibility does in fact hinge on the presence of the mandatory monitoring points/equipment. A definition has been added.</p>	
<p>Methodology Developer Response Date: 09/06/2023</p>	
<p>Edits by Verra Developer Team are accepted. See also minor edits and comments in documents.</p>	
<p>Verra Assessment Date: 26/06/2023</p>	
<p>1) closed</p> <p>2) closed</p> <p>3) closed</p>	

Finding 4 – Ownership -storage site proponent - closed

Finding 4	
Summary of finding: Ownership – storage site proponent	
Reference: (General)	
Type of findings: Action Request	
Description of finding	Date: 10/10/2021
<p>The non-permanence risk tool relies on government regulations in the jurisdiction where the project occurs. The proponent must have government approval and the government must assess and permit / license the project to be viable. If the proponent is not the same person/company that has the permits, Verra has little assurance and little recourse if the proponent is negligent or deliberate about managing reversals. Requiring the proponent to be the license/permit holder of the storage site solves this problem. We are willing to discuss any other possible solutions to this problem.</p>	
Methodology Developer Response	Date: 22/11/2021
<p>It was discussed with Verra that the storage site provider will play a major role in the project (even closing the door to make the storage site provider the sole project proponent). In general, as methodology developers, we are ok with it and the rationale behind. However, this has not been socialized with the partners and some views against it might be expected. A further alignment call will be requested to clarify this for the next version of the methodology.</p>	
Verra Assessment	Date: 21/01/2022
<p>Finding closed.</p>	

Finding 5 – Fuel/Electricity Contingency Estimation - closed

Finding 5	
Summary of finding: Fuel / Electricity Contingency Estimation	
Reference: Section 8	
Type of findings: Clarification	
Description of finding	Date: 10/10/2021
<p>The proposed CDM tools do not have any contingency for estimating fuel or electricity use. In situations where fuel or electricity use is not measured, it is not clear what a proponent should do. If they must measure all fuel and electricity, it should be an applicability condition. Examples where</p>	

fuel or electricity might not be measured include contractor vehicles or planes, small electrical loads at monitoring sites where electricity is paid based on a flat rate, cogen auxiliary power consumption, pre-combustion or oxy fuel combustion auxiliary loads that may be out of the project boundary (as described), etc.	
Methodology Developer Response	Date: 22/11/2021
An applicability condition has been added that the electricity consumption should be metered, see section 4.2 applicability condition 5.	
Verra Review Team Response	Date: 21/01/2022
Please clarify, no applicability condition is included in the latest version stating that electricity should be metered. The response to the finding with the fuel consumption is still missing.	
Methodology Developer Response	Date: 10/02/2023
The equations for quantification of project emissions have been moved to corresponding modules. In the modules, fuel use and electricity consumption are required to be monitored as parameters for relevant equations.	
Verra Assessment	Date: 14/04/2023
Finding closed.	

Finding 6 – Monitoring of leakage from aquifer/reservoirs - closed

Finding 6	
Summary of finding: Monitoring of leakage from aquifer / reservoirs	
Reference: Section 8	
Type of findings: Action Request	
Description of finding	Date: 10/10/2021
The module for aquifers currently includes an appendix with the same general overview for monitoring of leakage from storage sites previously provided in the concept note from South Pole. Providing a list of tools is not sufficient guidance since this Appendix is referenced as “Source of Data” and “Description of Measurement” for several required monitoring parameters. The application of these would be very open. While Verra does not have a final answer on how the monitoring should be carried out, the proponents need to provide further procedures and requirements to make sure the monitoring stringency is consistent with best-practices, minimizes the risk of leakage and environmental impacts (e.g. through early detection and action), and is accurate and robust to detect and quantify potential leakage.	

Methodology Developer Response	Date: 22/11/2021
A consultation process is ongoing with the partners to reach consensus on this matter for the next version of the modules 4.1 and 4.2.	
Verra Review Team Response	Date: 21/01/2022
No update has been made in this round. The review is still pending.	
Methodology Developer Response	Date: 10/02/2023
A more detailed monitoring plan and further guidance are laid out in the saline aquifer storage module.	
Verra Assessment	Date: 14/04/2023
Finding closed	

Finding 7 – Quality - closed

Finding 7	
Summary of finding: Quality	
Reference: (General)	
Type of findings: Action Request	
Description of finding	Date: 10/10/2021
<p>This review focused on high level issues. The next review will focus on more detail such as quantification method clarity, definitions, monitoring terms, monitoring requirements. The final review will focus on presentation, formatting, style, tone.</p> <p>We acknowledge that this is an iterative process and further refinement is to be expected. Though to be clear, the overall quality of the documents presented would not be sufficient for publishing for public consultation. Consistency between the modules, style, equation terms, presentation, and diagrams is needed. You should not only address the findings and comments included in the document, but also further think through and improve other parts.</p>	
Methodology Developer Response	Date: 22/11/2021
Modules were aligned to methodology further and cross alignment between modules have been done.	
Verra Review Team Response	Date: 21/01/2022
Interlinking of modules and tools: The linking between methodology framework document, modules and tools needs to be improved. It is often not clearly explained how the different documents work together.	

<p>The number of options in the methodology creates many use cases that need to be handled appropriately. There many different project scenarios that this methodology proposes, not including any expansion scenarios (greenfield/brownfield, multiple capture and storage sites, non-VCS CO2, removals, and all the modules).</p> <p>For example, it is difficult to follow how the <i>Methodology for Carbon Capture and Storage</i> and the <i>Tool for Differentiation between Emission Reductions and Removals in Carbon Capture and Storage Projects</i> are related. This should be improved for all documents by adding more context and guidance, and making sure all parameters and naming conventions align and it is clear which terms refer to which documents.</p> <p>Module Guidance: Add more context and guidance in the modules. As currently written, there is limited value in the modules since they simply refer back to the methodology for guidance on electricity and fuel, which just references to CDM tools.</p> <p>The modules should provide specificity on what types of capture/transport/storage systems apply and when estimation is allowed or appropriate, estimation procedures, and limits on where and how metering should occur. For example: Where and how should CO2 be metered? Where is appropriate sampling locations for concentration?</p> <p>The gas processing appendix in the gas plant capture module has a high level of detail to describe how the systems work. To set expectations, this amount of detail for every other module would be acceptable (though on the high side).However in addition to this, it needs guidance on how the measurement or estimation of process emissions should occur. Further, Appendix A is not referenced anywhere in the document. Please include relevant information from Appendix A in appropriate sections to support guidance in quantification.</p>	
Methodology Developer Response	Date: 10/02/2023
<p>For Batch 1 documents, the detailed quantification procedures are now moved to modules and more guidance have been provided. In addition, the monitoring requirements for involved parameters are refined. The same approach will be taken for the following batches to improve the guidance and interlinkages between the documents.</p>	
Verra Assessment	Date: 14/04/2023
<p>Finding closed.</p>	

Finding 8 – Equations – closed (FAR)

Finding 8	
Summary of finding: Equations	
Reference: Methodology, DAC module, transport module, aquifer storage module	
Type of findings: Action Request	
Description of finding	Date: 21/01/2022
Version 1.0 - The Procedures sections of all modules are incomplete and miss equations and	

parameters. Most parameters are also missing in the Data and Parameters sections.

This is not an exhaustive list, but a few examples include:

- 1) Module 2.1 – CO2 Capture from Direct Air Capture – project emissions from on-site fuel combustion. There should be an equation and parameters that describe how to quantify this. For example, $PECap,FE,y = (\text{Quantity of fuel}) \times (\text{Emission Factor})$. Please address this for all relevant parameters, for all modules.
- 2) Module 2.1 – CO2 Capture from Direct Air Capture. The module states “It should be noted that, when the electricity or heat consumed is produced on-site, the related project emissions can either be quantified on the generation side (i.e. accounting the related fossil fuel consumption ($PE_{(Cap,FC,y)}$) or on the consumption side, using the parameters $PE_{(Cap,EC,y)}$ and/or $PE_{(Cap,HC,y)}$. Double counting of project emissions shall be avoided”. This is insufficient and should be explained using equations and parameters.

Methodology Developer Response

Date: 13/02/2023

The detailed quantification equations for all the sources of project emissions have been moved to the modules in Batch 1, including DAC, transport, and saline aquifer modules. The same will be done for all the modules in the following batches.

Verra Review Team Response

Date: 14/04/2023

Please review the guidance in the [VCS Methodology Template, v4.2](#) and ensure all equations follow the correct formatting and instructions. Please also consider preparing a sample calculation (with fake data) to demonstrate the feasibility of the proposed equations for one complete project (DAC + Transport + Storage).

Methodology:

- 1) From the introductory text “The methodology must use the keywords “must,” “should,” and “may” appropriately. Consistent with best practice, “must” is to be used to indicate a firm (mandatory) requirement, “should” is to be used to indicate a (non-mandatory) recommendation, and “may” is to be used to indicate a permissible or allowable option (i.e., open for any other options not listed). The term “shall” is reserved for VCS Program documents and is generally not appropriate for methodologies.” See suggested edits in Section 8. Also please review the complete methodology and modules to ensure compliance.
- 2) Section 8.1.1 states “In the supercritical phase, CO2 behaves similarly to a liquid solvent, meaning other gases can dissolve into the supercritical-phase CO2. Therefore, the volumetric flow rate measurement reading of a supercritical phase CO2 stream can be inaccurate if there is any significant amount of impurities present in the CO2 stream. Additional guidance has been provided in this section to assist project proponents in applying the monitoring systems, procedures, reports, and calculations needed to determine the amount of CO2 in a reliable manner. To determine the amount of CO2, a project activity should measure the flow rate using either a mass flow meter or a volumetric flow meter.” Be specific which section gives additional guidance on when projects should use a volumetric flow meter or a mass flow meter. In Section 8.1.3, there is no restriction on using equations 4 – 6 for supercritical CO2 streams.
- 3) Please consider adding more description or guidance on how to determine the number of components in the mixture (n) used in Equations 3, 4 and throughout. Are trace

<p>amounts of all compounds required to be counted, or is there a cut-off?</p> <ol style="list-style-type: none"> 4) Equation 6 – please note the conversion seems circular between STP and actual conditions. This could be simplified after public consultation, especially if we receive comments on it (Future Action Request) 5) Data and Parameter tables – Parameters are included with N/A for the relevant equation. There should be a relevant equation for each parameter listed in Section 9. 6) Parameter– the calculation method for how to incorporate various frequencies of measurement into the quantification is missing. Please add relevant equations, parameters and guidance. Examples of parameters where this is missing include: $FR_{mass,x}$ (the mass measured by mass flow meter x), X_{CO2} (the mole fraction of CO2 in flow at flow meter x), etc 	
Verra Developer Team Response	Date: 14/04/2023
<ol style="list-style-type: none"> 1. PCG to do 2. PCG to do 3. Verra Developer Team Response (Subject to approval by meth team) – added text for 0.1% volumetric 4. Verra Developer Team Response (Subject to approval by meth team)- future action request (post PC) 5. PCG to do 6. PCG to do 	
Methodology Developer Response	Date: 09/06/2023
<ol style="list-style-type: none"> 1) Edits done Verra Developer Team are accepted. Some remaining occurrences have been reviewed and revised. 2) Some edits have been done in the text. Generally, we do not see a need to restrict measurement by volumetric vs. mass flow. However, based on feedback from public consultation we are open for further refinement. 3) Some edits have been applied regarding handling of trace substances. 4) Agree to revise based on feedback from public consultation. 5) Equation numbers have been updated/added in monitoring tables. 6) Guidance has been added on how to handle different measurement frequencies. 	
Verra Assessment	Date: 26/06/2023
<ol style="list-style-type: none"> 1) closed 2) closed 3) closed 4) closed - FAR 5) closed 6) closed 7) New FAR – do not reference specific versions of VCS or CDM or IPCC documents, always reference the latest version. 	

Finding 9 – Geothermal explanation - closed

Finding 9	
Summary of finding: Geothermal explanation	
Reference: Capture modules	
Type of findings: Action Request	
Description of finding	Date: 21/01/2022
<p>Geothermal energy sources are included in the quantification but are not explained as part of the boundary, baseline or emission sources to include or exclude. Please clarify how the geothermal plant affects baselines or add a specific baseline scenario. Also, clarify how the geothermal plant affects the project boundary or extend the project boundary description as needed.</p> <p>Can you further clarify what are non-condensable gases and why they are relevant? Please define and give context. We also suggest including a footnote in the module(s) for further clarification.</p>	
Methodology Developer Response	Date: 14/02/2023
<p>The geothermal fluid contains a variety of non-condensable gases which are comprised of mainly CO₂ (typically of more than 95 %). In the operations of dry and flash steam stations, the non-condensable gases do not condensate at the same condition of water vapor and therefore will end up being released to the atmosphere.</p> <p>In the DAC module, it is required that if energy is sourced from geothermal plant, CO₂ emissions from non-condensable gases must be considered in the emission factor.</p>	
Verra Assessment	Date: 14/04/2023
Finding closed.	

Finding 10 – Shipping – closed (FAR)

Finding 10	
Summary of finding: Shipping	
Reference: Module 3.2 - CO ₂ Transport via Ships, Section 5 - Procedures	
Type of findings: Action request	
Description of finding	Date: 21/01/2022
<p>Version 1.0 of the module lacks guidance for determining the project emissions, for example:</p> <ol style="list-style-type: none"> 1. In case the project participant does not have access to detailed fuel and electricity consumption (e.g., if the shipping company is not a project participant and does not 	

<p>meter the required data), it does not provide alternative options to determine project emissions, such as default values or procedures to derive conservative estimates (e.g., based on shipping weight and km) .</p> <ol style="list-style-type: none"> 2. There is no guidance for shared loads when VCS CO2 is shipped with other freight such as non VCS CO2 or completely different freight. The module currently fully assigns emissions to the VCS CO2 transported, which is overly conservative in some cases. 3. There is no procedure on how to allocate emissions from dead legs, e.g. if CO2 is shipped to the storage location and then the ships travels back either empty or only partially loaded. 	
<p>Methodology Developer Response Date: 15/02/2023</p>	
<ol style="list-style-type: none"> 1. An alternative approach using default values have been added. 2. This issue is addressed in the <i>VMT00XX: Tool for Baseline Quantification and Allocation of Project Emissions in Projects with VCS and non-VCS-CO₂ flows in Carbon Capture and Storage Projects</i>, which will be further developed in Batch 2. 3. In Section 6.1 of the transport module, it is required that project emissions must be considered for both outbound and empty return trips 	
<p>Verra Assessment Date: 14/04/2023</p>	
<ol style="list-style-type: none"> 1. Closed 2. This seems to be conflicting since Option A (direct measurement) uses the total energy consumption including all freight, i.e., also non-VCS-CO2 and other freight 3. Closed <p>Further, the following findings are raised:</p> <ol style="list-style-type: none"> 4. Clarification request: Section 6.2 includes distance limits for using default values. Why are such limits included? Given that the default values are conservative, there does not seem to be a reason to include limits. Default values would simplify the procedures for proponents and reviewers and avoid burdensome monitoring requirements. 5. In the section before Option A and B, include additional (qualitative) guidance for proponents on when Option A or Option B is recommended and more suitable, e.g., for which transport modes, direct or no direct control, conditions (such as share with other freight) to provide further clarity to proponents. This section should also outline what assumptions are made. For instance, for Option A, it is assumed that the full amount of fuels consumed are included, even if other freight is transported. And both inbound and empty return trips are included. This would give further clarity to proponents. 	
<p>Verra Developer Team Response Date: 14/04/2023</p>	
<ol style="list-style-type: none"> 1) - 2) PCG 3) - 4) Verra Response (Subject to approval by meth team)- Intentions are to manage the uncertainty. Only low impact transport segments can estimate values, otherwise the uncertainty becomes too high to manage. 5) PCG 	
<p>Methodology Developer Response Date: 09/06/2023</p>	
<ol style="list-style-type: none"> 2) Guidance has been added in the monitoring tables to address the finding. 	

4) Agree with response provided by Verra Developer Team. 5) See response above under #2
Verra Assessment Date: 22/06/2023
2) Finding closed. 4) Finding closed. 5) This has not been fully addressed. A FAR is included in this review report.

Finding 11 – Module Boundary Clarity - closed

Finding 11	
Summary of finding: Module Boundary Clarity	
Reference: Module 3.1 – CO2 Transportation via Pipelines, Module 3.2 – CO2 Transportation via Ships, Section 5 – Module Boundary	
Type of findings: Action Request	
Description of finding	Date: 21/01/2022
<p>Versions 1.0 of the Modules 3.1 and 3.2 state:</p> <p><i>“GHG emissions associated with the CO2 conditioning for transport via ships at the capture site or at the conditioning facilities, including the initial compression or pumping, refrigeration, drying or liquefaction fall inside the boundary of this module unless those emissions are accounted for under the corresponding Capture Modules.”</i></p> <p>The modules should clearly outline the boundary for each, to ensure consistency. Please provide guidance for when it is appropriate to include the CO2 conditioning as part of a capture or a transport module (inclusion in both should be avoided).</p>	
Methodology Developer Response	Date: 15/02/2023
The boundary is outlined in more detail for the consolidated transport module and further guidance on module boundary determination is provided by the methodology document.	
Verra Assessment	Date: 14/04/2023
Finding closed	

Finding 12 – Storage modules- closed (FAR)

Finding 12

<p>Summary of finding: Several findings for storage modules</p> <p>Reference: Storage modules</p> <p>Type of findings: Action request</p>	
<p>Description of finding</p>	<p>Date: 21/01/2022</p>
<p>This finding refers to the storage modules version 2 (saline aquifer and depleted O&G reservoirs):</p> <ol style="list-style-type: none"> 1) The storage modules are basically the same. We do not see any relevant differences that justify the development of two separate tools. On the other hand, the two storage types have key differences that should be addressed for each storage type. For example, depleted O&G reservoirs have a confined space and clear physical boundary and clear extension of the CO₂ plume, while saline aquifer do not have a confined space and the CO₂ plume can further expand over time (i.e. it is much more dynamic) which requires different monitoring procedures, requirements and risk management during operational, closure and post-closure phase. 2) The modules do not provide any specific procedures and requirements for leakage monitoring. They only refer to “industry standards” which is too open. Although there is a list of possible methods in the appendix, it leaves it open to the project participant if and how to apply these. This cannot be validated or verified without giving specific requirements. 3) The modules include the entire CO₂ plume in the boundary, but in the procedures there is nothing related to the CO₂ plume (e.g. how it is monitored in a saline aquifer). 4) The modules only include the operational phase, but not closure and post-closure. Can you explain how monitoring of potential leakage from the storage site in the three different phases is consistently done to ensure material leakage emissions can be determined and accounted for? 5) The modules include a section “Additional Guidance for Monitoring of CO₂ stored”. This section should be under “procedures” not “data and parameters”. Further, it is mixing injection monitoring and leakage monitoring. Probably it should be divided into (i) monitoring of injected CO₂ and (ii) monitoring of leakage from the storage site. Leakage monitoring should then be further split into different methods, such as surface, near-subsurface and subsurface. 	
<p>Methodology Developer Response</p>	<p>Date: 15/02/2023</p>
<ol style="list-style-type: none"> 1. Only the saline aquifer module is included in Batch 1. The discussion is going on as to whether the two storage modules should be combined and what differences there are between the two modules. 2. Further guidance on monitoring is provided in the saline aquifer module. 3. Further guidance on monitoring plan is provided. 4. The requirements for closure and post-closure periods are addressed in the latest GCS requirements of Verra. 5. Monitoring plan in addition to the requirements set in the VCS standard are added in Section 7.1 in the saline aquifer module, covering the requirement for a loss of CO₂ conformance and containment. 	

Verra Assessment	Date: 14/04/2023
<ol style="list-style-type: none"> 1. Finding still open (OK to remain open until after public consultation). 2. Closed 3. Not addressed. Can you clarify where and what guidance on CO2 plume migration/expansion and monitoring is included and how that ensures that the CO2 plume is fully tracked? 4. Closed 5. This is still not addressed. The Section “Data and Parameters” of some modules include additional guidance, for example a section “monitoring program” in the Saline Aquifer module does not fit under “data and parameters”. Please ensure titles, sections and content are consistent (also refer to methodology and modules templates) 	
Verra Developer Team Response	Date: 14/04/2023
<ol style="list-style-type: none"> 1) After public consultation, the modules are planned to be combined. This would occur prior to any documents having final publication (i.e., the published version of the storage module will be for both saline aquifers and depleted oil & gas reservoirs). 2) - 3) Verra Response (Subject to approval by meth team)- Additional details have been added about the requirements of the monitoring plan to detail monitoring frequencies, technologies, etc. in Section 8.3 In addition, there are requirements to detail actions when this is a loss of conformance or containment per Section 7.8 which relates to the tracking the CO2 plume. Additional reference to the GCS Requirements document has now been added which has further monitoring requirements that projects must follow including those specific to the jurisdiction where the project activity occurs. Due to the diversity of regulatory requirements, there are limitations to the prescriptiveness of the monitoring requirements that will be put forward. 4) - 5) Verra Response (Subject to approval by meth team)- This section has been updated to reflect the order and titles of the sections in alignment with the template. 	
Methodology Developer Response	Date: 09/06/2023
<p>Agree to all responses provided by Verra Developer Team.</p>	
Verra Assessment	Date: 26/06/2023
<ol style="list-style-type: none"> 1) Closed (FAR) 2) Closed 3) closed 4) closed 5) closed 	

Finding 13 – Definitions - closed

Finding 13

Description of finding: Definitions sections need to be revised Reference: Definitions sections: methodology, DAC module, transport module, aquifer storage module Type of finding: Action request	
Description of finding	Date: 21/01/2022
The definitions sections of the documents include terms that are not used in the same document where they appear. For example, Direct Air Capture (DAC) in the methodology framework document is not used in the same document. This section should only include definitions that are used in the same document. If they appear in other documents as well, they must be repeated (same language) in that document.	
Methodology Developer Response	Date: 14/02/2023
The definitions sections have been updated.	
Verra Review Team Response	Date: 14/04/2023
Please remove defined terms in the methodology and all modules that are not used in the document. For example, the methodology includes definitions for the following terms that are not used: fossil sources, geological storage complex, etc	
Verra Developer Team Response	Date: 14/04/2023
Verra Response (Subject to approval by meth team)- Revised.	
Methodology Developer Response	Date: 09/06/2023
Agree to edits in definition sections provided by Verra Developer Team. See some minor edits and comments provided directly in the documents.	
Verra Assessment	Date: 26/06/2023
Closed	

Finding 14 – Regulatory Surplus - closed

Finding 14	
Description of finding: Regulatory surplus should reference the Methodology Requirements Reference: Additionality section Type of finding: Action request	
Description of finding	Date: 21/01/2022

The Regulatory Surplus test should reference to the Methodology Requirements to make sure the most recent rules are applied.	
Methodology Developer Response	Date: 15/02/2023
The methodology requirements for regulatory surplus have been referenced.	
Verra Assessment	Date: 14/04/2023
Finding closed (pending the suggested edits by the Verra Development Team are accepted).	

Finding 15 – Additionality Analysis (finding renamed) - FAR

Finding 15	
Description of finding: Missing procedures, guidance and clarifications for additionality \ analysis (finding renamed on 3 April 2023)	
Reference: Methodology document: Additionality section (version 1)	
Type of finding: Action request	
Description of finding	Date: 21/01/2022
<p>The project method (investment analysis) is still very broad and does not provide specific procedures and guidance for the investment analysis. Specifically, the following questions should be further addressed:</p> <ol style="list-style-type: none"> 1. How to account for cash flows of shared facilities, specifically transport and storage facilities? 2. How to develop the investment analysis for new capture sites that are added to the project activities? 3. How to treat and distinguish cash flows inside the project boundary (e.g. fees paid by the capture facility to the storage facility) and such that flow to or out of the project boundary? <p>After discussing again internally, we think we should consider again the activity penetration option to simplify the additionality and since (nearly all) CCS projects are clearly additional in our opinion. (Note: we can further discuss this in a call)</p>	
Methodology Developer Response	Date: 15/2023
The additionality section has been revised and guidance has been added for specific cases.	
Verra Assessment	Date: 14/04/2023
1) Regulatory surplus: the current draft reads as if a regulatory surplus check must be conducted for each segment (capture, transport and storage). This does not follow the rationale of conducting a regulatory surplus check. The regulatory surplus check aims at preventing projects to get registered if a law or regulation implies a mandatory	

- requirement to conduct an activity (i.e., it would happen anyways enforced by law or regulation). Transport and capture do not seem to be relevant for the regulatory surplus check. Transporting or storing CO₂ cannot be enforced by any law or regulation, if it is not captured. There, it seems that only the regulatory surplus check for the capture segment is required. Please clarify or adapt.
- 2) It is not clear from which perspective the investment analysis must be conducted and who is considered the “decision maker” in this case (e.g., capture operator, transport, storage or all together). The draft methodology states that “*The costs (or revenues) from transport (if applicable) and storage activities must be incorporated into the investment analysis (e.g., a fee per ton of CO₂ transported and/or stored), regardless of the owner/operator of transport and storage facilities*” which indicates that the investment analysis should be conducted from the capture site owner perspective. However, this needs further clarity.
 - 3) “*The costs (or revenues) from transport (if applicable) and storage activities must be incorporated into the investment analysis*”. Finding: Can you clarify why revenues from transport could be relevant for the capture site? Please further clarify and include guidance.
 - 4) “*Such costs (or revenues) must reflect the estimated (or contracted if available) usage rate of transport and storage by each capture activity (e.g., if a capture activity uses 10% of the transport and storage capacity, the cost estimations must reflect the same 10% usage, not the entire costs of transport and storage)*.” Finding: Potential costs and revenues that cannot be supported by evidence at project validation require further rules and guidance to increase consistency. They also need to provide clarity for proponents on how to apply the rules and ensure it can be validated by VVBs with high confidence. Using “estimates” is not a good practice since it is too open ended and leaves room for gaming or not comparable results across projects.
 - 5) “*Direct payments and indirect financial benefits (e.g., savings) from the CO₂ source facilities to the project activity must be accounted for. This is regardless of whether the operators of source facilities and operators of capture facilities are the same entity. Examples include:...*” Finding: this paragraph only considers revenues and savings. However, if the performance of the CO₂ source facility changes and the owner of that facility is also the owner of the capture facility, increased costs (e.g., additional fuels required) should be accounted for. Also consider other costs that may be relevant.
 - 6) “*However, payments from the capture facilities to the source facilities for the CO₂ captured are not considered costs in the financial additionality analysis.*” Finding: It is not clear why these payments should not be considered if they are significant and relevant to the project activity. See also previous point 5 to align increased costs for operation of source facility.
 - 7) “*Contingencies for operating and maintenance (O&M) costs*” Finding: not clear if this section is about “contingencies” or “OPEX”. It is also not clear why there is not the same for CAPEX, if it is relevant for OPEX. Can you explain? What is different to other project types that require further clarification for OPEX?
 - 8) Common practice:
 - a. The procedures are not clear on how to determine the common practice (numerically). Further procedures should be included to provide clarity to proponents and VVBs on how to assess common practice.
 - b. Include requirements on what common practice is, specifically a threshold such as xx% when a project activity type is considered common practice.
 - c. There must be more specific guidance on what similar activities are. For instance, it is not clear electricity generation is one single category, or if subdivision into NG power plants, coal power plants, etc is required. The same applies for industrial processes, BECCS, etc.
 - 9) In general, it is still hard to follow the three steps of additionality (mainly investment

analysis) and understand how the proposed approach would be applied to a diverse range of project activities with different setups in terms of ownership, contractual structures, timing of decision making and allocation of past/future costs, etc. As a minimum, the above findings should be reasonably addressed before public stakeholder consultation.

- a. If the decision after the public stakeholder consultation is to go ahead with the investment decision, further improvements will be required based on public input and VVB/Verra reviews.
- b. Verra requires samples (i.e., drafts of additionality assessments for a few real cases) across a range of projects to be able to fully review the approach.
- c. The common practice analysis may also require a few examples (i.e., draft analysis) to complete the review

Verra Developer Team Response

Date: 14/04/2023

- 1) Verra Response (Subject to approval by meth team)- Adjusted. Agreed on the transport as it is optional but as this meth. Applies to capture and storage, this would be important considering future meths would be for capture and usage.
- 2) PCG
- 3) PCG
- 4) PCG
- 5) PCG
- 6) PCG
- 7) PCG
- 8) PCG
- 9) PCG

Methodology Developer Response

Date: 09/06/2023

- 1) Prefer to remain with testing for capture only. CCUS methodology can elaborate further on conditions on capture in combination with usage.
- 2) Perspectives should be from capture activities. Text has been revised to clarify the same.
- 3) Text has been revised to clarify potential revenue source (i.e., governments)
- 4) Especially under a situation of storage hubs, it will be difficult to avoid “estimations”. We suggest further refinement based on feedback from public consultation.
- 5) Any energy provided from the source facility to the capture process can be accounted as OPEX based on contractual arrangements.
- 6) This is proposed as safeguard avoiding an “artificial” price for CO2 that would be emitted in the absence of the project activity.
- 7) We are suggesting a contingency cost item specifically for OPEX due to the uncertainty of operating and maintenance cost of CCS projects. We deem such uncertainty higher for OPEX than for CAPEX.
- 8) We propose further guidance for common practice test to be provided by the related capture modules. For DAC, we assume the common practice test passed by default.
- 9) Examples of additionality assessments will be shared. Regarding common practice test please see #8. Agree to further refine based on feedback from public consultation.

Verra Assessment

Date: 26/06/2023

- 1) Closed
- 2) Closed
- 3) Closed
- 4) FAR
- 5) Closed
- 6) Closed
- 7) Closed
- 8) Closed
- 9) FAR

Finding 16 – Self supply of energy (FAR)

Finding 16	
Description of finding: Self supply of energy	
Reference: Section 8.3.4	
Type of finding: Action request	
Description of finding	Date: 21/01/2022
<p>Section 8.3.4 provides “specific considerations for self-supply of energy” which can result in increased fossil fuel consumption and emissions from additional electricity consumption.</p> <ol style="list-style-type: none"> 1. Since this additional fossil fuel consumption is outside the project boundary, these emissions should be included under “leakage”, not “project emissions”. 2. Given that this may result in significant emissions due to the implementation of the project activity, there must be further guidance and procedures (and potentially monitoring requirements) to determine these emissions and consider for final emissions reductions and removals. 3. In general, there is a lot of guidance missing . This section needs much more explanation to understand what is the intended use case, and what options exist for quantifying. The CDM Tool 5 does not seem fit for purpose for power plants (the source facility) that are not in the project boundary. 	
Methodology Developer Response	Date: 15/02/2023
<p>This section has been removed from the methodology framework as the quantification procedures for project emissions will be addressed in each module specifically. In the DAC module (section 8.2), the co-capture scenario for additional fossil fuel is discussed. The sources of the emission from additional fuel use is included in the boundary and considered as project emissions.</p>	
Verra Review Team Response	Date: 14/04/2023

The DAC module provides the following guidance on co-capture:

Co-capture of fossil fuel combustion CO₂ in the DAC module:

*When a DAC process captures CO₂ from onsite fossil fuel combustion, the total CO₂ from the DAC facility contains both atmospheric and fossil CO₂. The captured fossil CO₂ is considered a project emission in Equation **Error! Reference source not found.**) based on the quantity of fossil fuel used in the process. It is then subtracted from the baseline emissions resulting in the net carbon dioxide removal. The quantification thus tolerates the co-capture of fossil fuel combustion emissions at DAC sites when the baseline of total CO₂ injected is applied.*

- (1) Please clarify how a DAC process can capture CO₂ from onsite fossil fuel combustion. By definition, DAC is CO₂ capture from the air. CO₂ capture from onsite fossil fuel combustion would be a different process and not covered by this module (i.e., post-combustion capture from flue gas). It is not clear how the capture of fossil fuel CO₂ is relevant in the context of this module.
- (2) Clarify why the captured fossil CO₂ is a “project emission”. This is confusing. Specifically, this section already includes means to determine project emissions from fuel combustion in stationary equipment, which means that the CO₂ emissions are already covered in the equations. However, the CO₂ captured from additional fossil fuel consumption would require further procedures to exclude it from final injected CO₂.
- (3) This seems to require overarching guidance in the methodology, not specific modules on how to account for additional emissions from the source facility (not only project capture facility). See also point 2 to align resolution to this finding.

Verra Developer Team Response

Date: 14/04/2023

PCG Please clarify the text in the modules/meth accordingly and provide response here.

- 1) PCG
- 2) PCG
- 3) PCG

Methodology Developer Response

Date: 09/06/2023

- (1) Co-capture of fossil CO₂ is first of all specific to CE's DAC technology, but may also occur for other capture activities. For CE, the process captures CO₂ from air with two chemical loops: a potassium loop and a calcium loop..
 - a. In a nutshell, the CE DAC Process is capable of “co-capturing” the emissions from natural gas combustion because the natural gas is directly oxy-fired in the calciner. A calciner is a large fluidized bed reactor that is designed to convert the calcium carbonate (CaCO₃) into calcium oxide (CaO) and carbon dioxide (CO₂). This process step takes a large amount of heat (900°C) to drive this chemical reaction and release the atmospheric CO₂ that was captured in the calcium loop.
 - b. Atmospheric CO₂ is released from CaCO₃ decomposition and fossil CO₂ is generated from natural gas combustion. These two streams of CO₂ are mixed inside the calciner and exit as a single mixed stream of highly concentrated CO₂. This “co-captured” CO₂ from the calciner is sent along with the atmospheric CO₂ for to compression for transport and storage. Thus, the CE process is inherently designed to utilize the high energy content of natural gas while simultaneously capturing the resulting emissions as part of the process:

<p>hence the process can claim the benefit of “co-capture”.</p> <p>(2) Co-captured fossil-based CO₂ is considered a project emission to avoid conflating the amount of removals calculated with the amount of measured CO₂ injected at the storage site.</p> <p>a. The total amount of captured CO₂ injected would include both fossil and atmospheric CO₂ using the CE DAC process. The proposed method is a simplified approach that enables the project carbon accounting to subtract the amount of fossil CO₂ captured in the calcination step from the total measured CO₂ injected at the storage site to ensure the amount of removals credited to the project are based on only the CO₂ captured from air.</p> <p>b. Illustrative Example: Amount of CO₂ captured from air = 1 tonne Amount of CO₂ co-captured from NG combustion = 0.3 tonne Total CO₂ injected = 1.3 tonne DAC Project Baseline = Total CO₂ Injected = 1.3 Removals = DAC Project Baseline – Project Emissions = 1.3 – 0.3 = 1.0 tonne</p>	
Verra Assessment	Date: 16/06/2023
<p>(1) Finding closed. (2) Finding closed. FAR - to review and clarify parameters (3) FAR</p>	

Finding 17 – Baseline- Closed

Finding 17	
Description of finding: Baseline	
Reference: Methodology framework document	
Type of finding: Action request	
Description of finding	Date: 21/01/2022
<p>Baseline scenarios need to be clarified. Based on the text in the methodology, there can be multiple cases (we think):</p> <ul style="list-style-type: none"> - Greenfield capture (DAC – no source facility) - Brownfield capture capacity addition (DAC – no source facility) - Greenfield source facility / Greenfield capture - Brownfield source facility / Greenfield capture - Brownfield source facility / Brownfield capacity addition of capture - Brownfield source capacity addition / Brownfield capacity addition of capture (?) - Multiples of any combination of the above (for grouped projects) <p>A baseline scenario needs to be identified for each. These may be in the capture modules or the methodology document depending on how broadly applicable they are. This is particularly important for understanding self-supply of energy quantification and what emissions need to be accounted where. Clarity on what can be expanded in the capacity addition scenario is also needed. You can also include applicability criteria that exclude some of the scenarios listed</p>	

above.	
Methodology Developer Response	Date: 15/02/2023
Baseline scenarios considered are clarified in the methodology framework and DAC module. While there can be various combinations as mentioned in the finding, we differentiated only those scenarios that would result in different approaches.	
Verra Assessment	Date: 14/04/2023
Finding closed.	

Finding 18 – Leakage – closed (FAR)

Finding 18	
Description of finding: Leakage	
Reference: Methodology, DAC module, transport module, aquifer storage module	
Type of finding: Action request	
Description of finding	Date: 21/01/2022
More guidance is needed to clarify the extent to which emissions outside the project boundary from material and chemical consumption should be done. Thresholds or specific materials / processes for inclusion should be provided, with some justification as to the reasons for their inclusion.	
Methodology Developer Response	Date: 15/02/2023
<p>The concept of secondary effect is introduced to take in account the emissions from upstream emissions, embodied carbon emissions from construction materials and chemical consumption, etc. A materiality threshold of 1% is used to justify exclusions. Table 1 explicitly shows which emissions are included.</p> <p>All the emissions leading to secondary effects are included in the GHG boundary of project activities and are therefore accounted for as project emissions.</p>	
Verra Review Team Response	Date: 14/04/2023
<p>(1) The concept of secondary effects contradicts with the VCS definition of leakage. In the VCS Program Definitions, v4.2, leakage is defined as “Net changes of anthropogenic emissions by GHG sources that occur outside the project or program boundary, but are attributable to the project or program.” Please review the VCS Methodology Requirements, v4.3, section 3.3.1 – 3.3.3 and ensure all GHG sources, sinks and reservoirs are either: 1) clearly included within the project boundary, or 2) excluded from the project boundary and accounted as leakage in the appropriate leakage section. Please remove the content and language that refers to secondary effects, as it does not align with the VCS Program rules and requirements.</p>	

[VCS Methodology Requirements, v4.3](#), section 3.7.1 states “The methodology shall establish criteria and procedures for quantifying leakage.” Please review the guidance in the [VCS Methodology Template, v4.2](#), section 8.3 to complete the leakage section.

The materiality threshold of 1% may be an appropriate criterion for identifying whether a source is material and needs to be quantified (as project/baseline or leakage). The threshold of 1% is not appropriate for determining whether a source, sink or reservoir is within the project boundary or leakage. The determination of whether a source is within the project boundary or leakage depends on whether the project proponent has control over the source or not.

- (2) The concept of “embodied emissions” does not exist in the VCS Standard. Do not use such terms from other programs or references if not defined in the VCS Standard. There are baseline, project and leakage emissions under the VCS Standard.
- (3) For GHG sources and sinks that are not clearly material or de minimis (e.g., production and use of solvents), the developer must provide a justification in relation to the proposed de minimis threshold why they are included or not (sections 3.3.1 to 3.3.3 of the methodology requirements).
- (4) Forward action request: Verra will update the Methodology Requirements to include further rules on “de minimis” for non-AFOLU projects. The methodology and modules need to be updated once the Methodology Requirements are updated.

Verra Assessment

Date: 14/04/2023

- 1- Verra Response (Subject to approval by meth team)- 4 terms moved to leakage section. Use of secondary effects diminished in text project boundary text clarified to align with program definitions and meth requirements.
- 2- Verra Response (Subject to approval by meth team)- Embodied emissions removed
- 3- PCG
- 4- FAR = no response

Methodology Developer Response

Date: 09/06/2023

Agree to the edits and responses provided by the Verra Developer Team.

- 3- The de minimis threshold has been adjusted to 2%. Separate sample calculations will be provided as justification.

Verra Assessment

Date: 26/06/2023

- 1) closed
- 2) closed
- 3) closed. FAR - move materiality threshold/ de minimis assessment into an appendix and remove from main body of the document.
- 4) closed. FAR - ensure alignment with VCS Program updates as needed.



Finding 19 – Steam / heat consumption - closed

Finding 19	
Description of finding: Steam / heat consumption	
Reference: Methodology document	
Type of finding: Action request	
Description of finding	Date: 21/01/2022
<p>1) Please clarify the project boundary with respect to steam and heat consumption. If steam comes from a boiler that consumes fuel and releases GHG emissions (uncaptured) in the source facility, then this should be in the project boundary.</p> <p>2) Please justify the 50% efficiency default for boilers proposed.</p>	
Methodology Developer Response	Date: 15/02/2023
<ol style="list-style-type: none"> As demonstrated in the DAC module, if the heat comes from on-site fuel consumption, the source of heat is inside the boundary and thus Equation (2) and (3) in section 7.2 should be used for quantification This factor is removed. Equation (2) and (3) or (5) in the DAC module should be used to calculate emissions for heat use depending on the source of heat. 	
Verra Review Team Response	Date: 14/04/2023
<ol style="list-style-type: none"> This is inconsistent in the current methodology. For example, “project emissions from fuel combustion in stationary equipment” in the DAC module include both onsite and third party generation in the project boundary (see for example Section 7.2). This should be clearly defined and made consistent across project boundary and GHG quantification sections of all documents. Addressed 	
Verra Assessment	Date: 14/04/2023
<ol style="list-style-type: none"> Verra Response (Subject to approval by meth team)- This has been addressed with updates reflected in the module and in figure 2. Verra Response (Subject to approval by meth team)- Closed 	
Methodology Developer Response	Date: 09/06/2023
Agree with Verra Developer Team edits and responses.	
Verra Assessment	Date: 16/06/2023

Finding closed

Finding 20 – Data and Parameters – closed (FAR)

Finding 20

Description of finding: Data and Parameters

Reference: Methodology, DAC Module, Transport Module, and Storage Module

Type of finding: Action request

Description of finding

Date: 14/04/2023

Methodology:

- 1) Information is missing for several parameters (i.e. Description of measurement methods and procedures to be applied – for the density of CO2 at actual conditions). Please review the instructions and guidance provided in the VCS Methodology Template, v4.2 and ensure all data and parameters are adequately addressed in Sections 9.1 and 9.2.

Methodology Developer Response

Date: 09/06/2023

- 1) Tables have been updated as applicable. However, as also visible in recently approved VCS methodologies, it is not always feasible to provide related information.

Verra Assessment

Date: 26/06/2023

Closed. FAR to review again after public consultation.

Finding 21 – Greenfield source facility - closed

Finding 21

Description of finding: Greenfield source facility

Reference: Methodology, DAC Module, Transport Module, and Storage Module

Type of finding: Clarification request

Description of finding

Date: 14/04/2023

The methodology and the modules include the following description in the definition of the source facility:

“Greenfield source facilities are facilities that started operation within two years before the project start date of the project activity.”

<p>(1) Clarify why a distinction of greenfield and existing source facility is needed. This is not clear from the description and does not seem to be relevant to any VCS rules or requirements. Does this mean the baseline scenario does not apply to a source facility that started operation more than two years before the project start date? If that is the case, would that project be eligible to use the methodology? Or would there need to be a different baseline scenario provided for a source facility that started operation more than two years before the project start date?</p> <p>(2) Clarify what the rationale behind the two years for Greenfield source facilities is.</p>	
Verra Developer Team Response	Date: 14/04/2023
<p>1) Verra Response (Subject to approval by meth team)- Greenfield is referenced in section 6 (Baseline) of the methodology and DAC module to differentiate existing facilities and those that are less than two years.</p> <p>2) Verra Response (Subject to approval by meth team)- Two years has been deemed an appropriate timeframe following engagement with members as a reasonable timeframe to consider newer projects in consideration of construction timelines for example.</p>	
Methodology Developer Response	Date: 09/06/2023
<p>Agree with Verra Developer Team edits and responses.</p>	
Verra Assessment	Date: 16/06/2023
<p>.Closed</p>	

Finding 22 – Amortization of project emissions over lifetime - closed

Finding 22	
<p>Description of finding: Amortization of project emissions over lifetime</p> <p>Reference: Methodology, DAC Module, Transport Module, and Storage Module</p> <p>Type of finding: Action request</p>	
Description of finding	Date: 03/04/2023
<p>Some project emissions are distributed over the lifetime of equipment. If project emissions are relevant, they must be accounted for at the moment they occur. They cannot be amortized over time. Correct this for all emissions where relevant.</p>	
Verra Developer Team Response	Date: 14/04/2023
<p>1) PCG/Verra- Note as it stands, the distribution of the emissions over the lifetime has been removed.</p>	
Methodology Developer Response	Date: 09/06/2023

<p>1) Agree to remove distribution over lifetime though this would be an important condition to allow projects being registered under the new methodology. However, emissions from construction and initial fill have been now excluded based on updated de minimis threshold to allow projects to be registered and viable.</p>	
Verra Assessment	Date: 16/06/2023
Finding closed	

Finding 23 – Emissions from the production of capture materials - closed

Finding 23	
Description of finding: Emissions from the production of capture materials	
Reference: DAC Module	
Type of finding: Clarification request	
Description of finding	Date: 14/04/2023
<p>The proposed approach for determining emissions from the production of capture materials is using a “compliance market-approved tool or an equivalent method”.</p> <ol style="list-style-type: none"> (1) Who would determine what an “equivalent method” would be? This is very open ended and unclear how it would be applied by proponents and VVBs. (2) It seems to be overly burdensome to establish LCA or similar studies for an input material such as solvents and review them by VVBs. Are there any existing studies that would allow deriving default values for the methodology? 	
Methodology Developer Response	Date: 09/06/2023
Text revised and further comments provided in documents. Providing suitable default values is not feasible.	
Verra Assessment	Date: 16/06/2023
Finding closed	

Finding 24 – Heat from cogeneration - closed

Finding 24	
Description of finding: Heat from cogeneration	
Reference: Different modules	

Type of finding: Action request	
Description of finding	Date: 14/04/2023
<p>The parameter “<i>Heat from cogeneration</i>” ($Heat_{cogen,y}$) is provided in several modules. The measurement method indicated is “<i>Measured from a calorimeter or calculated from receipts/invoices.</i>”</p> <ol style="list-style-type: none"> (1) How would this be “calculated” from receipts/invoices? Further, heat can be directly measured based on enthalpy. This direct measurement should be the preferred option. Receipts and invoices can be included for cross-checks. (2) Using calorimeters seems to be too simplified. Usually, the measurement of heat requires a more detailed procedure, including the difference of the enthalpy of the steam <u>generated</u> minus the enthalpy of the condensate <u>return</u>. See also references in CDM tools available. 	
Methodology Developer Response	Date: 09/06/2023
Monitoring table have been further adjusted to reflect the findings.	
Verra Assessment	Date: 16/06/2023
Finding closed	

2. ASSESSMENT CONCLUSION

All items raised during methodology review have been closed or are FAR to be addressed after public consultation.

To clarify, the methodology needs to undergo full assessment and approval. The acceptance of this draft methodology for public consultation does not guarantee the approval of the methodology and modules.