

# SUMMARY OF PUBLIC CONSULTATION

## VM0043 Methodology for CO2 Utilization in Concrete Production, v1.1

A draft of *VM0043 Methodology for CO2 Utilization in Concrete Production, v1.1*, was open for public consultation between September 18, 2024 and October 18, 2024. This document includes a list of all comments received and the developer's response.

## KEY QUESTIONS

Q1: Referring to the Appendix II: Testing Procedures to Determine Baseline Cement Quantity: If project proponents have a large number of mix designs at a given project site or across a portfolio of locations, is it adequate (in terms of representativeness and scientific rigor) to carry out tests on the company's mix designs that comprise at least 50% of production volume? In what ways can the testing of design mixes be improved?

**Q1: Referring to the Appendix II: Testing Procedures to Determine Baseline Cement Quantity: If project proponents have a large number of mix designs at a given project site or across a portfolio of locations, is it adequate (in terms of representativeness and scientific rigor) to carry out tests on the company's mix designs that comprise at least 50% of production volume? In what ways can the testing of design mixes be improved?**

#	Organization	Comment	Developer's Response
1	CarbiCrete	While this may be an appropriate testing procedure for determining baseline cement quantity in ready-mix concrete, we believe that it cannot be applied to a pre-cast scenario.	Clarification has been added in the text to address commenter feedback.

Q2: Are attestations a robust way to be used as a proof of the CO2 source? If yes, what should be the requirements for such attestations?

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2	3Degrees Group, Inc.	The language in the protocol revision currently states that 'if a 3rd party supplies the CO2 they must agree to spot checking of their data by a verifier'. This is often not a viable option, as the project proponent will contract with a concrete facility for production, which will then contract with a CO2 supplier through separate agreements or supplier terms. Assurance of the source as biogenic is essential to be verified. This can come through contractual agreements or attestations, as long as the sourcing and timing or volume are accounted for through the documentation. The attestations or contracts can also cover environmental claims, but requiring consultation with the verifier seems unnecessary when contractual agreements or attestations exist.	Thank you for this input. It has been noted and no further action is needed.
3	CarbiCrete	We believe that an initial attestation from the supplier, coupled with purchase orders from the producer, is an adequate mechanism for proving the source of CO2. Arranging for spot checks by a verifier may be difficult however, and in many cases impossible. In many cases, the project proponent may not even be a contracting party.	Thank you for this input. It has been noted and no further action is needed.

Q3: Is the proposed procedure to split reductions and removals for both BE and PE accurate and robust? In which ways could the proposed method for differentiating baseline emissions and allocating project emissions between emission reductions and removals be improved?

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#	Organization	Comment	Developer's Response
4	3Degrees Group, Inc.	<p>Yes, 3Degrees supports the procedure to split reductions and removals for the BE and PE scenarios. However, we'd like to clarify that if a project utilizes and mineralizes CO2 in the concrete in order to meet Applicability Condition 1 but it is determined that the CO2 came from an ineligible source or the source cannot be tracked through attestations, we would advocate that the project proponent can still claim any reductions associated with the reduced or no cement usage. This is in line with the emission trading system (ETS) scenario outlined in Applicability Condition 6.</p> <p>We disagree with the 30% default upstream displacement deduction in the Baseline Emissions and have elaborated further on that in another comment.</p>	Thank you for this input. It has been noted and no further action is needed.
5	CarbiCrete	<p>CarbiCrete is pleased to be able to provide public comments on the revisions to VM0043. We look forward to further discussion on any of the recommendations outlined below.</p> <p>We strongly support the splitting of reductions and removals, and for the most</p>	Thank you for this input. It has been noted and no further action is needed.

**Q3: Is the proposed procedure to split reductions and removals for both BE and PE accurate and robust? In which ways could the proposed method for differentiating baseline emissions and allocating project emissions between emission reductions and removals be improved?**

#	Organization	Comment	Developer's Response
		<p>part, agree with the proposed procedures for splitting reductions and removals.</p> <p>However, we strongly believe that:</p> <ul style="list-style-type: none"> <li>• The application of a 30% discount factor for upstream displacement should not apply in instances where project proponents can adequately demonstrate a 1:1 displacement, which Section 3.8.5 of the VCS Methodology Requirements 4.4 allows for. If a producer retrofits an entire production line in a way that only enables them to use that line for producing concrete that uses CO2 as a feedstock, for example, we believe that demonstrates a 1:1 displacement. Similarly, if a producer is using a cement replacement to produce these products at an existing facility, an analysis of purchase orders for the cement replacement and historic purchase orders for cement could demonstrate a 1:1 replacement.</li> <li>• The requirements of 8.1.1. Section C are unfeasible for precast concrete. Certainly, a precast concrete manufacturer could provide samples to a third-party lab for testing, but it is unreasonable to expect the products to be produced anywhere outside of a precast manufacturing plant given the equipment and infrastructure involved.</li> </ul>	

**Q3: Is the proposed procedure to split reductions and removals for both BE and PE accurate and robust? In which ways could the proposed method for differentiating baseline emissions and allocating project emissions between emission reductions and removals be improved?**

#	Organization	Comment	Developer's Response
		<ul style="list-style-type: none"> <li>The application of a 60% default efficiency of mineralization in 8.1.2 Option 2 is unnecessarily punitive. If a project proponent can accurately measure and demonstrate how much CO<sub>2</sub> is being mineralized through their process, then the actual efficiency of mineralization should be used. In instances where CO<sub>2</sub> is introduced to the products in a sealed environment, a straightforward measurement method would involve using flow meters installed at the inlet and outlet of the relevant vessel to calculate the amount of CO<sub>2</sub> sequestered using the ideal gas equation (CO<sub>2</sub> in - CO<sub>2</sub> out = CO<sub>2</sub> mineralized). To ensure further accuracy, this could be cross-validated with manual readings of CO<sub>2</sub> tank levels.</li> </ul>	

# GENERAL FEEDBACK

## Section 3 - Definitions

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#	Organization	Comment	Developer's Response
6	3Degrees Group, Inc.	<p>Mix Design - As 'mix design' can refer to either baseline or project mix design, and the difference between the baseline mix and the project mix is integral to determining the avoided emissions reductions, we ask Verra to increase clarity around the verbiage 'mix design' throughout the protocol to impress the interpretation that baseline mix design and project mix design have distinct emission factors.</p> <p>Supplementary Cementitious Material (SCM): We'd suggest broadening the definition of SCMs to include novel products like pozzolans, biogenic limestone, biochar and others. A reference point would be the definition of SCMs in Climate Action Reserve's U.S. Low-Carbon Cement Protocol.</p>	More clarity has been provided on mix designs, and the definition of "SCM" has been revised.
7	CarbiCrete	Given that the reduction of upstream emissions from cement production is a key benefit brought about by the application of this methodology, we feel that "cement replacement," which is used in the methodology's definition of Concrete, should itself be a defined term.	The definition of "cement replacement" has been added, and the definition of "pre-cast concrete" has been revised.

### Section 3 - Definitions

#	Organization	Comment	Developer's Response
		<p>We propose the following definition for “cement replacement”: Often referred to as Alternative Cementitious Material (ACM), a cement replacement is a material that can fully replace Portland cement as the binder in concrete.</p> <p>We believe that many of the occurrences in the document of “cement” should be replaced with “cement or cement replacement.”</p> <p>An example would be in the definition of Mix Design: "The masses of ingredients, including cement [or cement replacement], sand, gravel, aggregate..."</p> <p>We also believe that the current definition of Precast Concrete includes some mis-categorizations, and that the last sentence should be replaced with something similar to the following: Examples include concrete masonry, hardscapes, and reinforced concrete elements.</p>	

### Section 4 – Applicability Conditions

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8	CarbiCrete	Section 4 5), could lead to confusion. We understand the intent of the passage to be	Thank you for this input, no change needed is needed at this time. Complete cement replacement can be taken

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		<p>to ensure that the products being produced by project activities are causing upstream displacement of products made in the traditional way. As currently written, one could understand this condition to be referring to the downstream substitution of one building material for another.</p> <p>In all instances where it is suggested that products have “the same” performance as the baseline, we propose replacing “the same” with “equivalent or better.” An example can be found in Applicability Condition 2.</p> <p>We believe that many of the occurrences in the document of “cement” should be replaced with “cement or cement replacement,” and that all instances of “less cement” should read “less or no cement.”</p> <p>An example would be:</p> <ul style="list-style-type: none"> <li>• Applicability Condition 1: “...a process that requires lower [or no] amounts of cement...”</li> </ul>	<p>up during the next major revision.</p>



## Section 5 – Project Boundary

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#	Organization	Comment	Developer's Response
9	CarbiCrete	<p>We propose the following modifications to Figure 1:</p> <ul style="list-style-type: none"> <li>• Replace “Cement Production” with “Production of Cement or Cement Replacement”:</li> <li>• Replace “Less Cement Used” with “Less or No Cement Used”</li> </ul>	<p>Thank you for this input, no change needed is needed at this time. Complete cement replacement can be taken up during the next major revision.</p>

## Section 6 – Baseline Scenario

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#	Organization	Comment	Developer's Response
10	3Degrees Group, Inc.	<p>We'd suggest clarifying that while CO2 would be ineligible for removals if it is diverted from utilization applications that lead to permanent sequestration of the CO2, it would remain eligible if it is utilized but then re-emitted to the atmosphere (i.e. CO2 used for beverages or greenhouses as an example).</p>	<p>Thank you for this input. It has been noted and no further action is needed.</p>

## Section 8 - Quantification of GHG Emission Reductions and Removals

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#	Organization	Comment	Developer's Response
11	3Degrees Group, Inc.	<p>The draft revision notes that projects must take a 30% discount factor for their baseline emissions for upstream displacement. Section 3.8.5 of the VCS Methodology Requirements 4.4 allows project proponents to use a number of methods to prove that the displacement figure is 1:1, including production facility records, survey data, or reports compiled by industry associations. Low/no cement concrete and CO2 mineralized concrete are nascent markets with very low market share so far. As such, there is no readily available peer-reviewed literature or government studies on upstream displacement for the global industry as a whole. With concrete production expanding rapidly, a false analogy could form that a reduction in cement usage from low CO2 concrete (a small market share) does not result in lower cement production. Many of the projects we work with will be installed at an existing facility and take over the production line that used to be traditional concrete, some with contractual requirements that the plant is not allowed to use those production lines for traditional concrete production any longer. We advise Verra to either research further into the 1:1 displacement in this industry to remove the 30% discount for the methodology entirely</p>	To be considered in the next major revision.

## Section 8 - Quantification of GHG Emission Reductions and Removals

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		<p>or to allow for project proponents who can prove a 1:1 displacement figure via production records in cases where the project activity is occurring at a production facility that is converting traditional concrete production lines to production lines that produce concrete to apply a methodology deviation and remove this discount. Project-specific changes to discount factors have been approved in CDM methodologies, methodology deviations are verifiable under Verra's VCS program, and other concrete methodologies have allowed for attestations or contractual agreements to show that the project concrete is replacing traditional cement.</p>	

## Section 11 - Appendix I: Activity Method

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#	Organization	Comment	Developer's Response
12	3Degrees Group, Inc.	<p>Most Appendix details, Positive List research, and default efficiency testing still only heavily reference the ready-mix segment of the industry. Because the revised methodology proposes to include</p>	<p>Appendix-I has been updated.</p>

### Section 11 - Appendix I: Activity Method

#	Organization	Comment	Developer's Response
		pre-cast as an eligible product, we ask Verra to update this and other appendices to include precast-specific metrics.	
13	CarbiCrete	We recommend a complete rewrite of Appendix I, given how much of it is outdated and given the fact that it was written to only consider implications for ready-mix.	Appendix-I has been updated.

### Section 12 - Appendix II: Testing Procedures to Determine Baseline Cement Quantity

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#	Organization	Comment	Developer's Response
14	3Degrees Group, Inc.	Appendix II states, "The test batches must yield the same levels of compressive strength (or have the project level mix have a greater strength than the baseline)" regarding the testing methods for project and baseline mix designs. However, in the protocol section 8.1.1, Qcement in the baseline is determined by comparing a product of equivalent function or compressive strength to the project mix. We advise Verra to clean up the language around the baseline equivalence so as not to confuse project proponents as to what their baseline Qcement ratio should be based on.	Language has been updated for consistency.

## Section 14 - Appendix IV: Additional Information on Testing Amount of CO2 Stored in Concrete

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#	Organization	Comment	Developer's Response
15	CarbiCrete	We propose replacing “The injected CO2 will be mineralized through a chemical reaction with the cement,” with “The injected CO2 will be mineralized through a chemical reaction with the cement or cement replacement.”	Statement has been revised.

## General Feedback

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#	Organization	Comment	Developer's Response
16	3Degrees Group, Inc.	<p>APPENDIX VI: DEFAULT EFFICIENCY OF MINERALIZATION.</p> <p>Appendix VI in particular, which influences the default mineralization rate, was only tested on a ready-mix material. Verra should expand their testing options for Option 1: Testing to Determine Quantity of CO2 stored in concrete (Section 8.1.2) beyond carbon analyzers in labs, as that option is most appropriate for ready-mix. Pre-cast concrete can be tested in the curing chamber where the product is made. Additionally, the testing for this Appendix should be re-done with pre-cast &amp; ready-mix products. The average conversion rate</p>	The assumed efficiency of mineralization is applicable for both ready-mix and precast concrete. The default value and other options for determining efficiency can be considered for the next major revision.

General Feedback			
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		<p>for ready-mix was 93% and lowering that to 60%, while conservative, is overly punitive for a default value where there is an additional recommendation for 30% upstream displacement deduction to the baseline. We encourage Verra to increase their accuracy of defaults through updated testing for all products now allowed under the protocol, including ready-mix and pre-cast, as well as expanding the site-specific testing language to include “laboratory measurements or other scientifically sound methods”, not just a prescriptive “carbon analyzer”.</p>	
17	CarbiCrete	<p>It is understandable that, due to the history of this methodology, there are several sections remaining (particularly in the appendices) that, while relevant in a ready-mix context, cannot be equally applied to precast concrete. We believe these should be addressed for clarity. We have identified some of these instances below.</p> <p>Additionally, the appendices include a fair amount of outdated industry information that no longer reflect the reality of the low carbon concrete market. We recommend this be acknowledged or updated.</p>	<p>Necessary changes have been made to reflect the revised methodology scope.</p>