Book and Claim for Cement and Concrete

Comprehensive framework outlining key functions and components for a book and claim chain of custody model in the cement and concrete sector

Version 1.1, Adopted November 2026

A partnership between

GMA MRMI



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1. Introduction

Cement and concrete are responsible for approximately 8% of global greenhouse gas emissions, yet many of the technologies needed to decarbonize the sector remain in the early stages of deployment. Accelerating their adoption will require strong demand signals and new mechanisms to channel investment beyond traditional procurement. A book and claim system addresses these needs by enabling a broader set of stakeholders to support the production of low-carbon materials, while ensuring through rigorous tracking and verification that investments correspond to actual emissions reductions. By mobilizing demand, book and claim can serve as a critical catalyst for sector-wide decarbonization.

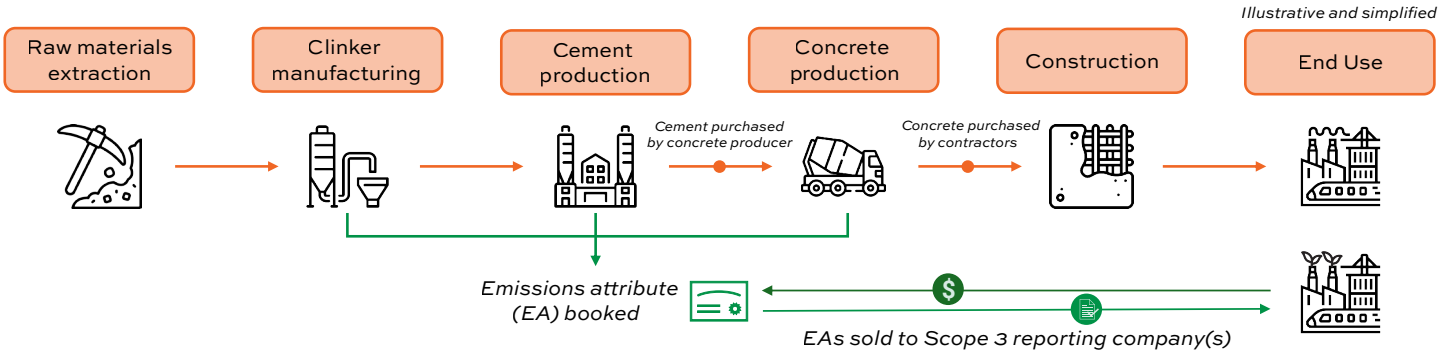
To advance this opportunity, in December 2024, the Center for Green Market Activation (GMA) and RMI (founded as Rocky Mountain Institute) gathered a group of stakeholders to inform the development of a book and claim market for the industry. GMA and RMI, the "Organizers," worked with the participants of the Working Group to outline the core principles and design components for how book and claim should operate. The intent of this framework is to inform book and claim transactions, environmental attribute certificate (EAC) issuance, and digital registry tracking rules.

1.1 What is "book and claim"?

Book and claim is a chain of custody model that allows environmental attributes (such as carbon intensity) to be decoupled from a physical product or service that carries those attributes. Through this model, a certificate representing the product's environmental attributes (known as an EAC) is issued and then sold and transferred to a buyer without direct access to the lower-carbon product in the physical value chain, enabling them to financially support decarbonization efforts and claim the associated environmental benefits towards their Scope 3 inventory reporting.

For book and claim to function effectively at scale, strong credibility and sustainability guardrails are essential. Inaccurate measurement, lack of transparency, or variability in approach can limit scalability or risk the credibility of the entire system and market.

Exhibit 1: Illustrative book and claim model in cement and concrete



Source: GMA and RMI

For producers, book and claim offers a way to expand market reach of low-carbon products without the need to physically ship products beyond traditional boundaries, which is particularly important in the cement and concrete sector, where market activity is mostly regional due to high transport costs. By decoupling environmental attributes from the physical product, producers can monetize low-carbon production even in markets where local customers are not yet willing or able to pay a premium. This creates new revenue streams and enables long-term offtake agreements that can help de-risk investments in low-carbon technologies such as alternative binders and carbon capture, utilization, and storage (CCUS).

Buyers, on the other hand, engage in book and claim to meet Scope 3 emissions reduction targets when low-carbon products are not locally available for physical procurement or when intermediaries in the value chain are unwilling or unable to manage logistics or incremental costs associated with procurement of low-carbon materials. It enables buyers to overcome supply chain limitations, aggregate procurement across projects or regions, and catalyze the market for future growth.

Although new to concrete and cement, book and claim is well established in other sectors. The most notable examples of book and claim are in the renewable energy and sustainable aviation fuel (SAF) markets. In renewable energy, renewable energy certificates (RECs) or guarantees of origins (GOs) are issued and sold to corporate buyers seeking to reduce their Scope 2 emissions who may not have access to renewable sources on the grid or on site. In the aviation market, corporate travelers and air freight shippers use book and claim to fund SAF and claim the benefits toward their climate targets. Since these buyers typically are unable to directly procure from fuel producers, book and claim is among the few mechanisms for corporate customers to invest in and reduce their aviation emissions, short of reducing flying. Each of these systems provide guidance and best practices that can be leveraged for the development of a book and claim system for the cement and concrete industry.

1.2 Difference between book and claim and mass balance chain of custody models

Mass balance and book and claim are both chain of custody models used to allocate environmental benefits. However, they manage the relationship between physical products and environmental attributes differently. While book and claim enables the separation of environmental attributes from the physical product, mass balance maintains a physical linkage but defines how environmental attributes can be assigned across multiple outputs. More information about mass balance is available in Appendix D.

1.3 Framework interaction with the broader ecosystem

This document aims to generate a representative, sector-specific perspective on how book and claim should be applied in the cement and concrete industry. It lays out core principles and foundational guidance that reflect input from a diverse set of stakeholders. With shared rules and expectations, market actors can engage in this emerging space with greater confidence in the credibility of certificates to help reach climate goals and the bankability of long-term certificate offtake agreements.

This work does not exist in a vacuum. It was developed with an explicit goal of aligning with and contributing to broader ecosystem efforts. During the writing of this document, the Science Based Target Initiative (SBTi) and Greenhouse Gas Protocol (GHGP) are both undergoing revisions to their standards, including new approaches to the treatment of market-based mechanisms. ISO has also recently published ISO 22095-3 requirements and guidelines for book and claim.

GHGP and SBTi have not historically accepted the use of market-based measures, including book and claim certificates, for Scope 3 inventories or targets, but both bodies are signaling strong indication toward their acceptance in ongoing revisions. SBTi released an updated V2 draft of its Corporate Net Zero Standard in November 2025 clearly stating the need and incorporation of indirect mitigation instruments such as book and claim. A final version of the standard is expected sometime in 2026. At the same time, GHGP has assembled a group of experts into the Actions and Market Instruments (AMI) technical working group to develop a standard or guidance that outlines how companies can account for and report the impacts of market instruments such as book and claim certificates. Discussions within the AMI working group are ongoing and the final standard or guidance is not expected until 2028. This process attempts to reflect the latest developments and anticipated direction from those bodies.

Concurrently, GMA is a co-organizer of the Advanced and Indirect Mitigation Platform (AIM Platform) alongside Gold Standard and C2ES. In April 2026 the AIM Platform published its Standard and Guidance v1.0 ("AIM Standard") that combines the previous draft iterations. The AIM Standard brings cross-sectoral consistency and alignment to Scope 3 value chain interventions, including those using book and claim. This framework leverages concepts and guidance outlined in the draft AIM Standard regarding quality criteria, accounting, data tracking and reporting . The cement and concrete framework in this document will complement the AIM standard, providing more detailed, sector-specific guardrails and components where needed. However, it does not seek to cover all topics outlined in the AIM Standard.

This framework is an important starting place from which the Organizers and industry stakeholders will build subsequent components of a robust book and claim ecosystem. This includes the development of a detailed rulebook and digital registry that can transparently track the issuance, transfer, and retirement of certificates. Lastly, individual companies and buyers' alliances like the Sustainable Concrete Buyers Alliance (SCoBA) can go beyond this framework to define additional specific attribute purchasing criteria in a way that aligns with their sustainability and business objectives. This framework sets the foundation for future transactions but should not constrain buyers from layering in their own purchasing criteria in addition to the requirements contained in the document.

1.4 Guiding principles of framework design

At the beginning of the design process, the Working Group agreed that an effective book and claim system should be:

- **Credible**: Credible from an environmental standpoint, driving high-integrity atmospheric benefits
- **Usable**: Straightforward and usable to facilitate scalable market transactions for low-carbon cement and/or concrete attributes
- **Compatible**: Compatible with existing regulatory and non-regulatory frameworks and best practices
- **Comprehensive**: Comprehensive across a range of decarbonization solutions to ensure the book and claim system can support multiple viable pathways to low-carbon cement and concrete
- **Unifying**: Designed to serve diverse geographic regions and markets, minimizing fragmentation and promoting geographic equity in access to decarbonization opportunities
- **Adaptable**: Designed for longevity and adaptability for future low-carbon technologies

1.5 Framework contribution and consultation

The Working Group was comprised of the Organizers, GMA and RMI, alongside approximately 30 organizations including asset owners, developers, construction companies, cement and concrete producers, nongovernmental organizations, and others.

The working group included, but was not limited to, individuals from the following organizations:

Amazon
Boston Consulting Group
Brimstone
CarbonCure Technologies
CarbonBuilt
Carbon Leadership Forum
Cemex
Building Transparency
Deloitte
Cementis
First Movers Coalition
Fortera
Google
Heidelberg
Holcim
Meta
Microsoft
Mission Possible Partnership
Mundys
National Ready Mixed Concrete Association
New Climate
Ozinga
Prologis
Ryan Companies
Sublime
The Climate Pledge
Trammell Crow
Turner Construction

The Organizers and Working Group participants held monthly meetings with additional sub-topic discussions to inform the development of this framework. The goal of the Working Group was to achieve broad consensus on all key system design criteria contained in this framework.

1.6 How to use this document

The terms “shall” or “must” are used throughout this framework to indicate a requirement for book and claim certificate issuance, transactions, and/or tracking. The term “should” indicates a recommendation, but not a requirement, and “may” indicates an option that is permitted or allowed. This document in its current form should not be used as a normative standard, nor should it be used as the basis for an audit. Rather, this document should be considered a broad set of principles and best practices for establishing a book and claim system in the cement and concrete sector.

This document is organized as a series of elements that together constitute the book and claim framework for the concrete value chain. Each element is accompanied by a rationale intended to provide helpful context, including justification and considerations.

Please note that this document assumes an advanced understanding of greenhouse gas accounting and familiarity with standards such as Greenhouse Gas Protocol (GHGP), Science-based Targets initiative (SBTi), and Advanced and Indirect Mitigation (AIM) Platform, and product category rules (PCRs) for cement and concrete, among others. Appendix F includes additional resources related to these topics.

2. Book and Claim Functional Units

The functional unit of a certificate is the building block of the system that determines what is being booked, transferred, and claimed and how to ensure environmental integrity. This framework takes an approach that promotes flexibility in the market, while also reducing risk of over-crediting emissions impacts.

2.1 Eligible functional units for book and claim certificates

EACs may be generated at three stages of the value chain

1) Clinker: the intermediate product and primary ingredient to make a binder for traditional hydraulic cement, typically produced by heating limestone to ~1450°C
2) Cement: hydraulic cement that sets and hardens by chemical reaction with water (hydration) and is capable of doing so under water (cements conforming to ASTM C150, ASTM C595, ASTM C1157, AC529, or EN 197-1)
3) Concrete: a composite material that consists of a mixture of cement, aggregates, and water, with or without admixtures, fibers, or other cementitious materials to be used as the final construction product (concrete conforming to ASTM C94 or CSA A23.1/A23.2)

Decarbonizing the cement and concrete industry includes intervening at various steps in the value chain. Multiple functional units are included in the system to enable different pathways for supplier involvement and scaling of innovative solutions. Technologies and solutions targeted to leverage this chain of custody model include those that both reduce the emissions intensity of clinker, the most carbon intensive component of the industry, and reduce the use of clinker altogether. With several available functional units, a greater array of solutions can be utilized to channel investments.

In addition to greater technology pathways, multiple functional units plan for multiple accounting pathways. Revised standards from bodies such as GHGP, SBTi, and others are still in development and may impact the future viability and feasibility of certain functional units. Therefore, designing for multiple units provides flexibility and dynamism amid potential uncertainty.

In version 1.0 of this framework, SCM producers seeking to engage in the book and claim market had to either (1) achieve ASTM or EN certification as described in the cement functional unit or (2) integrate the SCM into a blended cement or concrete mix to issue the respective functional unit EAC. SCMs were ineligible to issue EACs directly given the limited proportion that most SCMs can represent in a cement or concrete blended product. Following the publication of version 1.0 of this framework, an addendum was developed by the Organizers and approved by the Steering Committee that establishes an approach to determining a representative replacement rate for SCMs and a pathway for SCMs to directly issue EACs (Addendum 9.1) under the cement functional unit. Additionally, SCMs may still be incorporated into cement and concrete products for which EACs are issued, in addition to the new pathway defined in the addendum.

3. Eligibility Criteria for EAC Issuance

In the novel and developing market for book and claim certificates, environmental integrity and adherence to existing best practices are paramount to market adoption and deployment. Several criteria have been developed to ensure revenue from the system is directed toward high impact areas and is consistent with best practice from other markets such as for SAFc and RECs.

3.1 Product emissions intensity threshold

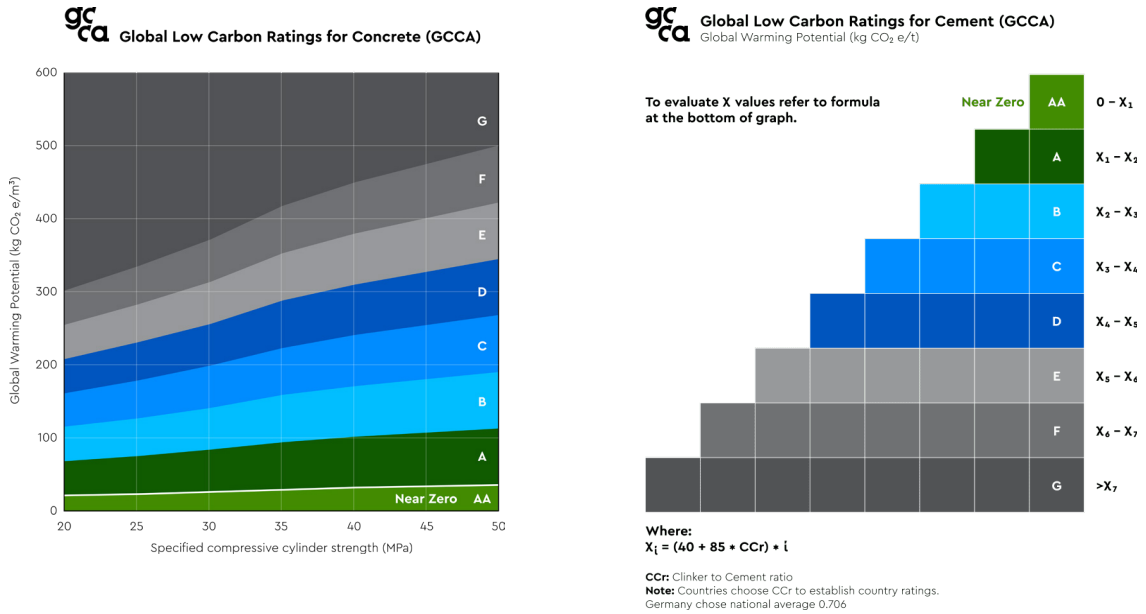
From 2025 to 2035, the EAC-generating product must have a minimum rating of 'C' as defined by the GCCA low-carbon ratings for cement and concrete for the specific production region.

Beginning in 2035 and thereafter, EAC-generating products much achieve a rating of 'B' or better. The threshold rating is a floor for credible environmental attribute certificate issuance under this framework. Buyers or other stakeholders may also provide additional eligibility criteria or emissions reduction requirements for specific transactions.

To calculate the regionalized GCCA ratings, the designated country clinker-cement ratio should be used when possible. If unavailable, the clinker ratio should be identified using GCCA's GNR database when coverage is greater than 50% of the country's volume. If coverage for a given country is less than 50%, the global clinker ratio from GNR may be used. GCCA bands should be normalized to reflect local standards, following additional guidance from GCCA once available. Appendix C illustrates the rating bands as of January 2026 for select countries, without any further normalization, as a reference (note that these figures will change and EACs must match eligibility at time of issuance).

The Global Cement and Concrete Association (GCCA) in 2024 released the Global Low Carbon Ratings for Cement and Concrete, which developed a standardized system to categorize and compare products. The rating is designed to be dynamic based on the market and adjust over time as average clinker factors decrease.

Exhibit 2: GCCA Low-Carbon Ratings



Source: GCCA, GCCA Global Low Carbon Ratings for Cement and Concrete

The regional specificity and variability of the rating system helps to ensure that book and claim is pushing decarbonization relevant to the market. If a particular market's cement or concrete products have lower carbon intensity to begin with, the threshold will be lower accordingly, increasing ambition for book and claim and directing the additional revenue toward catalytic activities that are not readily available for that specific market.

A phased approach is taken in this framework to (1) maintain global consistency, (2) acknowledge varying levels of market maturity, and (3) drive deep decarbonization and ambition in the medium to long term. In markets where C-rated products may exist today, purchasers and producers should not use the EAC system and should, instead, focus on direct procurement of those products. In markets where C-rated products are unavailable, EAC issuance over the next four years can be catalytic to increasing availability of higher ambition products and maturing novel technologies so that they may reach a rating of B or better by 2030.

The Organizers recognize the need for deep decarbonization and net-zero products to meet the internationally recognized science targets. As such, the Organizers may reevaluate the minimum system eligibility threshold over time.

3.2 Disclosure of all applicable regulations

EAC-generating products and the associated environmental attributes must disclose all regulations that are applicable to the EAC issuer or upstream products that impact production or emissions of the material, facility, or producer. Transparency of all regulations enables purchasers to determine and track compliance with regulatory surplus requirements or preferences.

The EAC should categorize what type(s) of regulations the issuer or upstream producers are subject to, using the following definitions:

Regulation Category	Description
1) Policy-free	Producer is not obligated by any policies or provided government incentives to decarbonize its products.
2) Incentive-driven	Producer or upstream products have received government incentives that facilitate the lower emissions intensity issued on the EAC.
3) Action-oriented mandates	Producer or upstream products are obligated to reduce emissions by taking specific actions or procure/produce materials with certain characteristics tied to the EAC. Relevant regulations include (but are not limited to) facility-level emission caps, product emissions-intensity limits, and production requirements tied to certain environmental attributes.
4) Market-based regulatory system	Producer or upstream products are regulated under market-based systems that mandate specific emissions outcomes or actions across all regulated parties. Relevant regulations include emissions trading schemes and economy-wide caps that regulate total emissions but do not require specific actions by individual entities.

Regulatory surplus is the characteristic of an intervention or associated product attribute that demonstrates whether the emissions outcome achieved was beyond those mandated or incentivized by regulations. Regulatory surplus — also called regulatory additionality — has been a core component of many EAC markets and certifications to provide purchasers confidence that their investment led to emissions impact that otherwise would not have occurred.

Transparency into all applicable regulations that the EAC issuer and upstream suppliers are subject to allows the purchaser to track the adherence to any regulatory surplus requirement provided through the contractual agreement. The categorization further demonstrates typical ways in which buyers may evaluate the impact of these regulations, making it clearer and more easily digestible in the event that an EAC is subject to multiple types of regulations.

This framework follows best practice in other book and claim standards and registry rulebooks by requiring regulation disclosure. Namely, RSB's *Book and Claim Manual* outlines a similar characterization of regulation types. Standards and frameworks such as AIM Standard and SBTi will provide additional guidance on regulatory surplus eligibility. Additionally, industry buyers alliances, such as the Sustainable Concrete Buyers Alliance (SCoBA), may set their own perspectives and best practices for evaluation of regulatory surplus.

Note, demand-side regulations, such as building codes and procurement policies, are not tracked because specific buyer details may not be known at point of EAC issuance. In addition, these codes and policies are not relevant for determining regulatory surplus as the physical product recipient must not utilize the low-carbon attribute of the product that has sold its EAC separately (see Section 8 for more details).

3.3 Catalytic procurements

> Purchasers should prioritize EAC procurement from technologies and products that require the additional revenue stream from the environmental attribute to reach investment viability (i.e., financial additionality). Each purchaser or set of buyers may determine their own approach for evaluating technology and product needs for EAC procurement.

Financial additionality is a subset of broader additionality tests that evaluate revenue and costs of an intervention to determine whether investment would have been financially viable without the added revenue from commercialization of the environmental attribute.

While the intent of financial additionality has high integrity and ambition, financial additionality evaluations in the carbon market space have been subject to criticism due to the large number of assumptions present in financial models and the subjective judgment required to evaluate whether financial additionality has been reasonably proven. Project developers can often manipulate assumptions or claims to demonstrate financial additionality and create a false sense of accuracy.

As such, a clear and objective financial additionality test has not been put forward by any other comparable book and claim system for environmental attributes specifically focused on Scope 3 emissions activities. For example, no financial additionality test exists for EAC buyers alliances or standards including the Sustainable Aviation Buyers Alliance, RSB Book and Claim Manual, and Green-e Certification.

Instead of a formal requirement for financial additionality, guardrails are implemented to direct the EAC market away from traditional products and ensure resources are used to deploy novel products. As such, non-beneficiated, non-activated ground granulated blast furnace slag (GGBFS) and non-beneficiated, non-activated fly ash, cumulatively or alone, cannot be the primary decarbonization lever. Specifically, GGBFS and fly ash cannot exceed 50%, by mass, of all low carbon cementitious materials (defined below) within a cement or concrete blended product issuing an EAC.

> **Traditional clinker (i.e., clinker with unabated process emissions):** Clinker that does not directly abate process emissions, defined as having a GWP greater than 525 kgCO2e/t of material, excluding biogenic removals.
>
> **Low carbon cementitious materials (e.g., ACMs, SCMs, clinker with CCUS):** alternatives to traditional clinker that have lower GWP and aim to displace traditional clinker usage. To be determined a low carbon cementitious material for the purposes of this requirement, clinker must have a GWP < 525 kgCO2e/t, excluding biogenic removals.

Non-activated and non-beneficiated GGBFS and fly ash are cost competitive with OPC and are supply-constrained, such that all available supply is expected to be utilized without any further incentives. They are common practice today and are often blended to 50% and 35%, respectively. This requirement ensures that EACs are generated only from novel solutions beyond commonplace GGBFS and fly ash without unreasonably constraining the ability of producers to sell what is commercially best suited for their market. If producers are unwilling or unable to share cement or concrete mix designs to protect confidentiality, EAC issuers may receive third-party verification of adherence to this criteria, which must be recorded on the registry and certificate documentation. The table below outlines potential blended cement examples that would be eligible and ineligible based on their relative proportion of cementitious material, by mass.

An approach to defining decarbonization reduction based on emissions impact, rather than mass, was considered, but a comprehensive and simple methodology was not identified. If a methodology that isolates the decarbonization reduction of each constituent component is developed by ISO, EN, ASTM, or under the GMA and RMI cement and concrete book and claim framework, it may be considered as an additional pathway for determining product eligibility. Any such methodology would require approval by the framework governance body prior to adoption.

Example blended products

Eligible products examples[1]	Ineligible products examples
• CEM III cement with 45% GGBFS, 50% clinker with CCS • Blended cement with 20% fly ash, 30% clinker with CCS, 45% traditional clinker • Ternary blend of 25% calcined clay, 20% GGBFS, and 50% clinker	• Slag cement with 50% GGBFS, 45% clinker • Ternary blend of 25% calcined clay, 30% GGBFS, and 40% traditional clinker • CEM III with 55% GGBFS and 40% clinker with CCS

1 Examples assume approximately 5% gypsum or other minor constituents that do not contribute to strength development

4. Emissions Intensity Measurement Methodology

Chain of custody models outline the flow of information from a product down the value chain, originating at the producer and passing through several hands until the product reaches its final destination or use. Existing transactions for cement and concrete predominantly use a direct, physically segregated chain of custody model: the environmental attribute of the physical product is tracked through each intermediary until it reaches the end state, providing the information on the specific product environmental attributes. In this model, environmental product declarations (EPDs) that follow the product category rule (PCR) guidance have been instrumental to sustainability measurements in the market.

For alternative chain of custody models such as book and claim, the measurement and boundaries of the product's attribute should not change. What changes is the path that the information takes to get to its final end user. The measurement methodology for book and claim leverages the existing EPD standards, creating consistency with direct, physical product reporting and accounting. This limits burden on suppliers, verifiers, and purchasers.

While EPDs can be used for 5 years from issuance, there is currently no monitoring system to validate that the input materials and processes reported within the EPD based on the historical assessment period remain consistent during the subsequent 5-year period during which the EPD is valid. Many low-carbon products require ongoing procurement of decarbonized inputs or process operations to produce a product with low global warming potential (GWP) (e.g., renewable fuels and electricity, carbon capture). As such, more frequent EPD issuance or additional third-party auditing is necessary to provide increased assurance to the buyers that the EACs they purchase reflect accurate product emissions. To ensure accuracy of the EPD, the EPD must either (1) be conducted within 12-months of when an EAC is eligible to be issued, or (2) achieve third-party verification that the underlying EPD practices have been maintained.

4.1 Clinker intensity measurement

For an EAC issued from a clinker product, the emissions intensity must be calculated consistent with the applicable PCR of the production jurisdiction and demonstrated with a third-party verified product-specific Type III EPD. Given the absence of a clinker EPD, clinker products may use the applicable cement PCRs with a 100% clinker ratio.

To ensure accuracy of the EPD, the EPD must either (1) be conducted within 12 months of when an EAC is eligible to be issued, or (2) achieve third-party validation that the underlying EPD practices have been maintained.

Applicable cement PCRs include ISO 14025 + ISO 21930:2017, EN 16908, EN 16757:2017, EN 15804+A2, Smart EPD® Part B PCR for Cements for Construction 1000-010, v4.0, PCR for Slag Cement v2.0, and Part B PCR for Supplementary Cementitious Materials Standard 1000-002.

Matching the clinker measurement with a cement EPD increases consistency and ensures matching boundaries to the how the PCR is defined. This enables comparability between a clinker EAC and the clinker in their inventory that is measured through the cement EPD.

4.2 Cement and concrete intensity measurement

For EACs issued from cement and concrete products, the emissions intensity must be calculated consistent with the applicable PCR of the production jurisdiction and demonstrated with a third-party-verified product-specific Type III EPD.

To ensure accuracy of the EPD, the EPD must either (1) be conducted within 12 months of when an EAC is eligible to be issued, or (2) achieve third-party verification that the underlying EPD practices have been maintained.

Applicable cement PCRs include ISO 14025 + ISO 21930:2017, EN 16908, EN 16757:2017, EN 15804+A2, Smart EPD® Part B PCR for Cements for Construction 1000-010, v4.0, PCR for Slag Cement v2.0, and Part B PCR for Supplementary Cementitious Materials.

If cement product category rules are not defined in the production jurisdiction, an LCA aligning with the system boundaries and methodologies of EN 16908:2022+A1 or Smart EPD® Part B PCR for Cements for Construction 1000-010, v4.0 may be used.

If concrete product category rules are not defined in the production jurisdiction, an LCA aligning with the system boundaries and methodologies of EN 16757:2022 or NSF 1112-19 PCR for Concrete v2.3 may be used.

Aligning with existing PCRs creates consistency with physical, direct offtake practices within a region. This mitigates discrepancies between what is claimed via the EAC and the physical product, supporting reliable accounting and fostering trust among buyers and supply chain participants.

Absence of regional guidance on PCRs should not preclude participation in the system. As such, several PCRs are named to enable adoption where otherwise not specified.

4.3 Additional considerations for carbon capture technologies

In accordance with sections 4.1 and 4.2, all materials issuing an EAC must have the requisite EPD. Currently, however, most PCRs do not outline explicit guidance for the treatment of carbon capture technologies for clinker or cement production. In jurisdictions that do not include PCR guidance to enable carbon capture technologies, producers may leverage rules outlined in other applicable PCRs to issue an adjusted EPD.

As of November 2025, the only known PCR to include carbon capture and storage (CCS) is Annex A of Smart EPD. The methodologies of Annex A can be used to generate the emissions intensity of the product, adjusted for any discrepancies in boundaries between PCRs.

Carbon capture is a critical technology to enable global cement production to reach net zero. Including the emissions savings of CCUS in the product's emission's intensity will enable the market to commercialize these attributes and drive further deployment.

The Organizers urge program operators and standard setters to issue guidance that enables the inclusion of carbon capture technology, enabling the physical value chain to mirror that of the book and claim chain of custody model. In the interim, however, permitting the book and claim certificate to leverage separate PCR guidance is acceptable for the purposes of this framework.

4.4 Additional considerations for carbon storage

Emissions intensity of products using CCS must consider all leakage and emissions associated with the distribution and storage of the carbon. CCS products must demonstrate permanent sequestration, defined as ensuring a minimum of 100-years of permanence, and include a third-party verified certificate of storage.

Storage certificates should include information such as, but not limited to, location, storage company, captured carbon emission, leaked emissions or leakage rate, emissions for transportation, emissions for storage, and final quantity of carbon stored.

Carbon capture is only an effective intervention if the carbon storage is permanent. Verification of storage certificates provides transparency and credibility to the capture system. Existing guidance on carbon storage practices and certification remains limited but should be leveraged wherever available. Emerging standards and guidance — such as ISO 27914 for geological storage and the EU's Carbon Removal Certification Framework — are beginning to define consistent methodologies for monitoring, verification, and permanence.

Many regulatory frameworks and certification programs recognize a 100-year storage duration as the threshold for "permanent" carbon storage, ensuring that stored carbon delivers a meaningful atmospheric benefit.

Additionally, the method of carbon transport — whether by pipeline, ship, truck, or other means — plays a critical role in estimating potential leakage rates and overall system integrity. Effective monitoring and verification of transport pathways are therefore essential to maintain the credibility and durability of storage claims.

4.5 Additional considerations for carbon utilization

The emissions intensity of products using carbon capture that is sold and utilized by a downstream customer must demonstrate atmospheric benefit and long-term sequestration.

Given the lack of long-term sequestration and negative co-impacts to global emissions, enhanced oil recovery may not be used to substantiate an emission reduction for carbon capture technologies.

As described by Smart EPD Annex A, carbon utilization falls outside the system boundaries for an EPD, therefore the captured emissions burden falls to the potential emitter — the downstream purchaser of the carbon — leading to no actual atmospheric benefit. To mitigate the potential for captured emissions to be released downstream, utilization is only eligible if leading to long-term sequestration.

To date, carbon mineralization within concrete is the only known utilization pathway to meet such criteria. While there may be appropriate use cases for carbon utilization beyond mineralization, until there is greater traceability of carbon, utilization must be limited to carbon mineralization for EAC generation. This bars, for example, the use of captured carbon for enhanced oil recovery.



5. EAC Issuance and Data Tracking

It is fundamental in a book and claim chain of custody model that the environmental attribute reflects the actual product introduced to the market and not any kind of ex-ante, or forward looking, expectation. Speculative emissions reductions and accounting expose the market to scrutiny and claims of greenwashing if the actual impact is less than the forecasted expectation. As such, guardrails are needed to ensure credibility of claims from the system and provide robust data tracking to enable transparency to the market.

It is expected and encouraged that buyers will enter long-term offtake agreements for EACs. These agreements can be fundamental to enabling project finance for large scale decarbonization projects, particularly if executed credibly by following the described guardrails for issuance and claiming of EACs. While the contracts may be signed prior to development, the EAC issuance and tracking may only occur when a physical product enters the market.

5.1 Cadence of EAC issuance

An EAC may only be issued after the physical product has either been deployed for its final intended use or shipped to the next step in the supply chain.

Some examples of documentation that may be used to prove imminent use include, but are not limited to, bill of lading, delivery ticket, invoice, or declaration of performance. Please see Appendix B for further details.

Production alone does not constitute eligibility for EAC issuance.

For a purchaser to claim that the EAC can be used to address their inventory activities or that the atmosphere has seen a positive impact, the physical, low-carbon product must be utilized in a construction project. Production of a low-carbon product does not alone reduce emissions in the atmosphere. However, requiring that the physical product is tracked all the way to final installation would significantly increase the data tracking burden to the EAC issuer, diminishing the efficiency and purpose of the book and claim chain of custody model.

Consequently, shipment or sale of the low-carbon product is the best proxy to ensure that the product will imminently be used and is the most closely matched milestone between the atmospheric impact and when the EAC can be claimed. While there may be some cases when a product is delivered then never used, this is not a sustainable business model and would not occur at scale.

Producers issuing EACs may make their own commercial decisions on how, when, and at what frequency to issue certificates. Two examples highlight how a producer could determine whether they want to decouple and sell the EAC or keep the EA with the physical product.



Example 1

Future offtake for full production capacity: A producer has a forward offtake agreement for EACs that covers 100% of the plant's production. Consequently, they do not anticipate passing along the low-carbon attribute to any physical customers. The producer would provide all physical recipients of the product with the baseline emissions intensity and supporting documentation on what to use for accounting (see section 8). To limit administrative burden, the producer could use quarterly verification and issuance periods, aggregating all invoices from the period and their associated low-carbon EPDs (and all other required data), to issue and transfer EACs from that period.

Example 2

Withholding environmental attributes with the physical product: The producer has an indication from their local market that several builders want to purchase the low-carbon product with the environmental attribute still coupled (not using the book and claim chain of custody model). They make the commercial decision to sell 50% of the plant capacity through book and claim forward offtake agreements, retaining 50% of the products to sell directly to local customers. The producer sells 50% of volumes with the low-carbon EPD still coupled to those local customers, and 50% receive the baseline value recorded on supporting documentation alongside the EPD to avoid double counting. At the end of the issuance period, the producer could issue certificates for only those volumes that did not retain the environmental attribute for the physical customer using the sale or bill of lading data as proof.



5.2 Registry tracking

EACs must be tracked on a digital registry and must not be issued simultaneously on multiple registries.

Digital registries provide a transparent, auditable record of EAC issuance, transfer, and retirement. They are the source of truth and ledger that is used to minimize risk of erroneous double counting, providing purchasers with assurance in the validity of their claims.

5.2.1 Registry operation and management

Digital registries should be managed by a third party operated without a conflict of interest and include a public-facing retirement statement.

Credibility and assurance come from the EAC tracking on the registry — without a credible and secure registry, the whole market is at jeopardy of greenwashing claims. As such, ensuring that the registry is governed with environmental integrity and transparency is core to the system. Registry operators may be enticed to design the system or obscure data to provide a competitive advantage and issue more EACs, increasing revenue at the expense of integrity. Conflicts of interest can be mitigated by the registry being managed by an impartial entity to any individual stakeholder in the market and/or by implementing a multilateral governance body to oversee registry decision-making and operations.

5.2.2 Information tracked in registry

The digital registry must track the following data on the EAC, but may include other components:

- Date of issuance
- Producer
- Production location
- Purchaser
- Date of sale/shipment
- Sale/shipment documentation
- Functional unit (clinker, cement, or concrete)
- Product compressive strength(s)
- Product certification (e.g., ASTM)
- Decarbonization solutions
- Applicable regulations and incentives
- Regulatory disclosure
- EPD
- EPD verifier
- Product emissions intensity
- Baseline emissions intensity
- GCCA Low-Carbon Rating label
- Source of baseline intensity
- Storage and/or utilization certificate(s)

The registry is used to validate and provide transparency that an EAC meets the framework eligibility but may also be used by buyers to ensure compliance with any additional preferences that are included in their individual contracts. The registry, therefore, needs to not only include all fields required to prove framework adherence, but also those that are most likely to be considered or tracked by buyers.



6. EAC Accounting

As stated in the introduction, the standards and guidance landscape regarding accounting for book and claim EACs is currently in development by the AIM Platform, GHGP, and ISO. GHGP is currently undergoing an extensive revision process of its corporate standards, and is considering, through its Actions and Market Instruments (AMI) technical working group, how "market instruments" such as book and claim should be reported in a multi-statement GHG Inventory report. This revision process, however, is likely not to be finalized until approximately 2028.

To continue moving forward this critical work, the AIM Platform has developed its own standard outlining accounting approaches that companies can use to claim book and claim certificate purchases. The AIM Standard, released in April 2026, provides detailed guidance for companies looking to account for market instruments such as book and claim certificates in their corporate reporting. The standard outlines quality criteria for assessing eligibility and credibility, tests for determining value chain association of interventions, accounting and reporting structures, and other relevant components.

The AIM Standard describes accounting substitution, including when and how adjustments are needed to accurately reflect atmospheric impact. To avoid duplicity, this framework highlights the fundamental components of substitution and substitution with adjustments and provides further details where needed for the cement and concrete sector. Readers should review the AIM Standard for details, rationale, and further examples.

6.1 Substitution Accounting Approach

As outlined in the AIM Standard section 6.1.2, the Substitution Accounting Approach is the preferred method to report impacts in the contractual corporate ledger, while adhering to the Product Matching requirements (AIM Standard Section 6.1.1). Under this approach, the emissions intensity on the EAC is substituted for the emissions intensity of the product in the company's physical ledger. An adjustment to the substitution approach is required if the EAC baseline differs from that of the component being substituted in the inventory.

6.1.1 Substitution (without Adjustment)

To be eligible for substitution without any adjustments, the EAC -generating product and physical inventory component must match three criteria:

1. The EAC must be denominated in the same functional unit as the inventory component, namely CO2e per mass or CO2e per volume.
2. The baseline GWP of the EAC-generating product (outlined in AIM Standard Section 6.1.3) must equal the GWP of the inventory activity that it is substituting.
3. The EAC generating product matches in product type and performance to the inventory activity that it is substituting, outlined in the below table.

	Geography	Product type	Product performance
Clinker	National or supra-national (e.g., EU)	NA	NA
Cement	National or supra-national (e.g., EU)	NA	*Within-range or greater than method* The minimum 28-day compressive strength of the physical product underlying the EAC must be equal to or exceed the minimum 28-day compressive strength of the physical product in the buyer's inventory for which substitution is claimed. If a 28-day compressive strength is not specified in the appropriate specification for either product (i.e., ASTM C150), 7-day compressive strength may be used for comparison. *Categorical method* The physical product underlying the EAC and the physical product in the buyer's inventory must fall within the same cement type category as defined by the applicable specification. For example, if the cement underlying the EAC conforms to ASTM C1157, both it and the product in the buyer's inventory must meet the criteria for classification as "General Use" to qualify for direct substitution.
Concrete	National or sub national (e.g., Northeast US)	Ready mix, pre-cast, masonry	*Within-range method* The maximum 28- or 56-day compressive strength of the physical product underlying the EAC must be within 5 MPa or 1,000 psi of the physical product in the buyer's inventory for which substitution is claimed.

NA indicates that no further matching is required in the applicable category

A similar substitution accounting approach is the current method for accounting renewable energy certificates. Today, GHGP Scope 2 guidance allows broad matching requirements, beyond what is physically deliverable and across markets that have significant different average emissions intensities.

For example, when a developer builds a new warehouse, they gather the mix designs and EPDs for all concrete and cements used from the general contractor. With this primary data, they can match their EAC purchases to these products based on the criteria outlined above.

In alignment with the direction of the REC standards, the additional matching requirements set forth above are intended to limit gaming of variability between markets. For example, if no matching requirements are included, a low-strength product from Europe could sell its EAC to directly substitute a high-strength product in the United States. Low-strength products, however, have lower GWP on average than high-strength products given the clinker factor, and, furthermore, European concretes typically have lower GWP than US concretes.

Criteria (3) above is additional to what is covered within the AIM Standard, but included as another guardrail to ensure product association. The technologies, decarbonization levers, and scalability of technologies vary significantly based on the product type and performance and this additional requirement will help promote companies spending resources on solutions best fit and proportional to their value chain.

On the other hand, it is important to ensure that matching criteria are not so specific that they prevent meaningful investments. For example, if direct matching also considered components such as workability, durability, exposure class, and others, demand could not be aggregated based on the multitude of specific requirements within and across buyers. Clinker, in contrast to cement and concrete, has fewer matching requirements because of its technical equivalence and limited variability. A geographic matching requirement at the national or supranational level, however, is maintained to address the discrepancies in PCRs across regions and regulatory environments, which both result in a different baseline emissions intensity when substituting across regions.

6.1.2 Substitution with Adjustments

When either criteria (2) or (3) in Section 6.1.1 are not met, an adjustment is needed to avoid over-reporting the impact of the intervention in the contractual ledger. The adjustment is a conservative measure that subtracts the baseline emissions intensity from that of the EAC. If the adjusted emissions intensity is below zero units of CO_2e per unit of product, zero must be used.

Substitution with adjustments must match functional units between the EAC adjusted emissions intensity and inventory product, and should aim to match product type and performance when possible. Scope 3 inventory activity may be comprised of primary data from suppliers or average/modeled data derived from life-cycle assessment (LCA) databases based on available data. If the EAC purchaser is using spend-based data for inventory accounting, the EAC purchaser should use the Activity Data Estimation approach outlined in AIM Standard Appendix H.

The adjusted emissions intensity for any product may not go below zero for use in a Scope 3 inventory. Impacts resulting in a negative emissions intensity may be aggregated and used for things other than value chain mitigation statements (e.g., as offsets).

For more details on substitution with adjustments, review the AIM Standard section 6.1.2.

Adjustments are used when there are granular product characteristics or geographic market dynamics that result in significant discrepancies in product emissions intensity. While substitution without any adjustments may be preferred, when possible, instances may exist where a sufficiently tight match cannot be made.

For example, imagine that an EAC buyer matches the product performance between their inventory and an EAC issuer, but that EAC issuer operates outside of the geography of the buyer's inventory activity. A direct match is not possible because baseline emissions may be different across the two regions. Discrepancies across markets may be the result of different regulatory policies or availability of local products (e.g., aggregates). As a result, it would be inaccurate for the buyer to simply substitute the GWP represented on the EAC into their inventory. However, adjustments offers a solution to this by evaluating the magnitude of an emissions reduction within the EAC issuer's market, leveraging either operational data or reputable GWP baseline values, and allowing the EAC buyer to decrease the GWP represented in their emissions inventory by the equivalent amount.

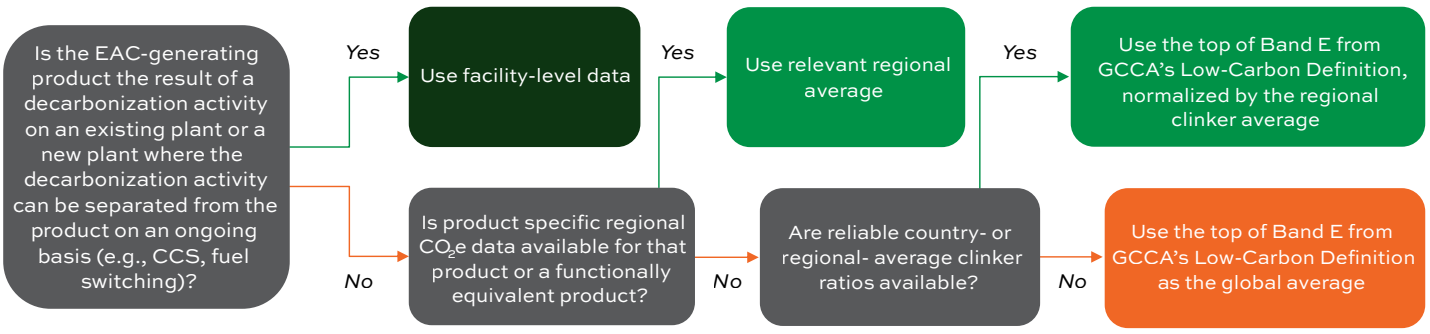
This can also be used to support an EAC purchase within a geography where a tight product performance match does not exist. The result is an approach that can enable a broader number of EAC transactions to take place without compromising the integrity of the emissions reduction measured in the system.

6.1.3 Adjustment Baseline

The EAC baseline represents the emissions intensity of the product that was most likely displaced by the EAC generating product. This baseline is used to determine whether a substitution adjustment is required, and the magnitude of the adjustment, if so. The baseline can also be used to calculate subcomponent product quantities, as outlined in the AIM Standard Activity Data Estimation approach.

When selecting the appropriate baseline, EAC issuers should adhere to the flow chart described in Exhibit 3 below and outlined in further detail for existing and new facilities below. For existing facilities, primary data on product EPDs prior to an intervention should be prioritized. When the decarbonization impact of a solution can be assessed continuously, such as the case with CCUS technologies, the product-specific EPD without the implementation of the decarbonization solution should also be used. For new facilities, local benchmarks matching the EAC-generating product should be used when available. In the absence of a credible and granular local benchmark, a conservative baseline from GCCA may be used.

Exhibit 3: Baseline selection decision process



Source: GMA and RMI

6.1.3.1 Baseline selection for existing facilities and products

If the EAC-generating product is the result of a decarbonization activity on an existing plant, the baseline shall be the emissions intensity of the equivalent product prior to the decarbonization intervention. If the intervention results in a fundamental change to the emissions accounting and can no longer determine the alternative emissions intensity without the impacts of the intervention on an ongoing basis, the baseline shall be the EPD prior to the intervention until that EPD has expired, to be no greater than 5 years. After expiry, the baseline should be the lesser of the prior EPD or the market average determined in 6.1.3.2.

If the update to an existing facility results in a product that was not produced at the facility prior, the baseline GWP should be a weighted average of all products that are functionally equivalent, defined by the criteria of section 6.1.1. If the data for a weighted average is unavailable, use the lowest GWP of all the equivalent products being replaced by the new production.

If the impacts of a decarbonization activity can be separated from the product emissions intensity on a recurring basis after the intervention, (e.g., CCUS), the product emissions intensity excluding the solution impact shall be used as the baseline.

The baseline emissions intensity must be calculated according to the same PCR methodology as the EAC. Baseline assumptions and calculations should be validated by a third party.

For a facility that has been retrofit and produces a material with the same functional unit as prior to the intervention, the most likely displaced baseline to the EAC-generating product will be from that same facility. This is the most locally specific baseline possible.

Using the facility level baseline has limitations, however, as facilities often make incremental efficiency and decarbonization upgrades over time. If the pre-intervention emissions intensity was used in perpetuity without a way to recalibrate, the facility may have reduced its average intensity over time anyways, potentially overstating the impact to the atmosphere by using the pre-intervention EPD. As such, these facilities must transition to use the baseline approach consistent with new facilities after the pre-intervention EPD expiration.



Example – CCUS on existing facility

A facility produces CEM I cement with a GWP of 850 kgCO_2e/metric ton of cement. The facility develops a CCUS project that can capture and store 95% of direct emissions, resulting in a GWP for the same product of 90 kgCO_2e/metric ton of cement. Because this facility can track, on a recurring basis, the captured and stored emissions and separate those from the emissions intensity that would have occurred in the absence of the CCUS system, the baseline of 850 kgCO_2e/metric ton of cement may be used.

6.1.3.2 Baseline selection for new facilities or products

If the product is manufactured at a new facility that did not previously produce an equivalent product, the baseline shall be representative of similar products for the local market.

The characteristics of the baseline should match as closely as possible to the EAC-generating product, based on available facility or market data. The baseline should match across all of the following criteria:

	Guidance	Criteria
Product type	Match by functional unit and product type if possible. If a direct match to a single product type is not possible, select the product type with the lowest GWP that is available within the production region of the EAC issuer to avoid potential overestimation of impact.	*Concrete:* ready-mix, precast – masonry, precast – other *Cement*: defined by relevant specification (e.g., Type I-IV, GU, MS, HE, MH, LH, HS, CEM I-III) *Clinker*: NA
Compressive strength	Match by compressive strength class (28- or 56-day), consistent with the approach in Section 7.1.	*Concrete:* The maximum compressive strength of the baseline product should be within ±1,000 psi (±5 MPa) of the EAC-associated product. *Cement*: The minimum 28-day compressive strength of the baseline product must be equal to or exceed the minimum 28-day compressive strength of the EAC-associated product. If a 28-day compressive strength is not specified in the appropriate specification for either product (i.e., ASTM C150), 7-day compressive strength may be used for comparison. *Clinker*: NA
Production region	Match by relevant geographic scope of production and market availability.	***Examples: local, regional, national, supranational (e.g., EU)***

If the EAC-generating product can be categorized across multiple product types, the baseline should be the weighted average GWP. If data to calculate the weighted average is unavailable, the baseline should be the lowest average GWP of the equivalent products.

A locally available benchmark matching the product should be the prioritized baseline when available. Appendix E outlines the approved baselines available as of November 2025 and will be maintained and periodically updated as new benchmark studies are published.

If using a market average baseline, the baseline must be updated in line with new publication of the benchmark. Data year of average baseline should reflect the most recent publication and be within approximately five years of EAC issuance. The market average must also be calculated according to the same PCR methodology or boundaries as the EAC.

If the impacts of a decarbonization activity can be separated from the product emissions intensity on a recurring basis after the intervention, (e.g., CCUS), the product emissions intensity excluding the solution impact shall be used as the baseline.

For geographies and products outside of those listed in Appendix E, EAC-issuers must use the top of the country-level GCCA Low Carbon Rating band 'E,' matching product strength and type, as the EAC baseline. If a county-level GCCA rating is unavailable, the EAC-issuer may use the global GCCA Low Carbon Rating band 'E' as the baseline for the matching product strength and type.

While the matching criteria are not comprehensive of all product characteristics for the cement and concrete industry, they represent the most influential indicators for average emissions intensity and are, therefore, sufficient to serve as proxy for the EAC product baseline.

Regional market averages are often already used by companies for their inventory accounting. Using these figures ensures a consistent and straightforward approach across EAC-issuers that limits the potential for significant gaming or subjectivity.

In the absence of third-party published benchmarks, the GCCA Low Carbon Rating provides another consistent and simplified option. Given the global applicability and potential for regions to be above or below the assumed average, band 'E' provides a more credible estimate for the displaced products to ensure impact of the EAC is not over-represented. While GCCA's Low Carbon Ratings require countries to adopt a country-specific clinker-to-cement ratio (CCR), as of January 2026, Germany is the only country to have adopted a CCR applicable to the rating scheme. In the absence of country-adopted CCR's, EAC generators may leverage the clinker-ratios defined in GCCA's "GCCA in Numbers" (GNR) resource for countries with greater than 50% coverage (see more in Appendix C).

Example – New facility producing a novel cement

A novel cement producer builds a new facility in the United States. The product conforms to the C1157 certification and could replace several kinds of cements as defined by the American Cement Association (Type I, Type IL, Blended). The novel cement producer should use the 2026 weighted average hydraulic cement emissions intensity published for the U.S. by Carbon Leadership Forum (CLF) of 875 kg CO2e/metric ton of cement as the baseline (see more in Appendix E).



6.2 Registry retirement

EACs must be retired within a digital registry to be reported and claimed by the purchasing company.

Retirement prior to accounting or claiming impact from the EAC ensures that the reporting company is being transparent and avoiding claiming the impacts in multiple annual reports. The retirement designates the final use of the EAC which can no longer be retired by any other entity at that layer of the value chain nor at any other time.

6.3 Allowable co-claiming

Only one organization may claim the Scope 1 and 2 emissions impact of the EAC-generating product. Multiple organization across the value chain may co-claim the Scope 3 emissions impact for the same EAC-generating product, matching how the product is typically accounted for in a physically segregated chain of custody model.

In the case of multiple Scope 3 claimants, only one entity at each layer of the value chain may make claims and retire within a registry. The allowable co-claimant layers should reflect the actual value chain. A more detailed registry rulebook will work with stakeholders to identify the best suited layers to enable co-claiming.

While direct emissions are limited to each company's activities within their operational or financial control (per GHGP inventory accounting guidance), indirect emissions are, by definition, overlapping across many stakeholders in the value chain. As a product moves through the value chain from supplier to customer, so too does its environmental attribute, counted toward each layer of Scope 3 inventory. In a book and claim model, the same concept may be applied but should be leveraged with guardrails to ensure integrity.

The number and type of co-claimant layers represents the primary categories of stakeholders involved in the value chain as well as those most likely to contribute to the EAC costs. While this is a simplification of the market, expanding the number of claimants can significantly increase complexity and potential for double counting. A detailed registry rulebook will outline the allowable co-claimant levels of the value chain. For example, co-claimant layers could include producers such as cement and concrete companies, market operators such as architect/engineering and general contractors, and end users such as developers and asset owners.



7. Physical Recipients of Products with Sold EACs

The book and claim chain of custody model is predicated on the product being used by the "physical recipient." Safeguards and transparent guidelines are required to reduce potential for double counting or greenwashing claims. If multiple stakeholders at any layer of the value chain make claims toward the reduced GWP of the product, the credibility of the entire system and chain of custody model could be jeopardized and diminished.

7.1 Avoidance of double counting emissions impact

Purchasers of the physical product that has decoupled its environmental attribute may not make any quantitative claim to the GWP or low-carbon nature of the product. This includes, but is not limited to, GHG inventory accounting, whole building LCAs, LEED certification, and corporate communications.

Physical recipients, may, however, make qualitative statements about the use of the products and experience with the supplier (consistent with any contractual disclosure and confidentiality agreements).

When the environmental attribute is separated from the product, the product can no longer be claimed as having the low-carbon GWP. This extends to all uses of the GWP, as the right to those claims are held by the EAC purchaser. This requirement limits double counting of the GWP and increases the credibility of the system.

Some products that will engage in the EAC market may not be readily available or known by the market today. There will be market education and awareness needed to increase adoption. As such, it is important for these physical recipients to be able to communicate about their experiences and learnings using these products — promoting their (hopefully) successful deployment. The physical recipients could publicize their use of products from a specific supplier, and proclaim the use of "sustainable" products, for example, without claiming any specific emissions impact.

This guidance may be updated based on the outcomes from the ongoing GHGP revisions, including key findings from the AMI technical working group.

7.2 Treatment of EPD and emissions intensity for inventory accounting of physical recipient

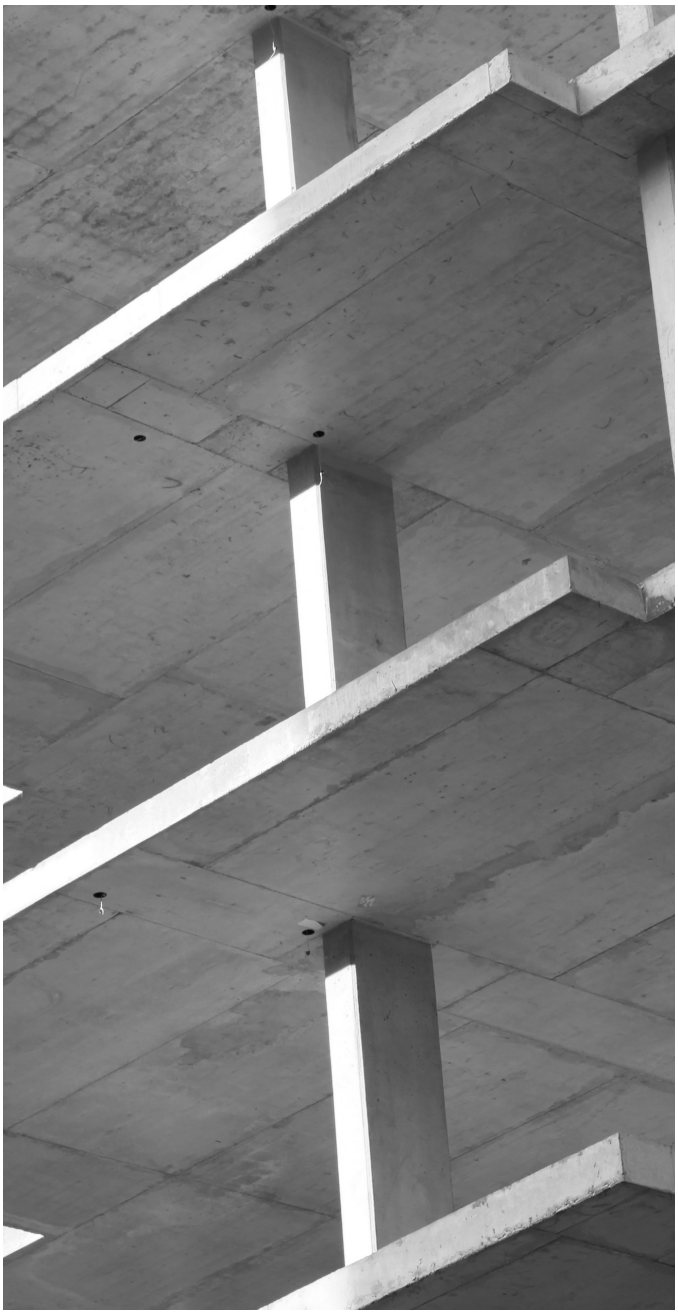
The EAC producer must provide the physical recipient with a baseline value to use for inventory accounting that does not include the low-carbon product. The baseline provided to the physical recipient should match that provided to the EAC purchaser, as described in Section 6.

The baseline emissions intensity should be integrated into the EPD disclosure process directly, through the existing "notes" section or future updates to relevant PCRs to enable book and claim disclosures, and indirectly, with an additional "cover page" that accompanies the EPD or digital tracking in the EPD database to flag the sale of the EAC.

EPDs are a critical tool for tracking emissions and promoting transparency and comparability of environmental impacts. PCRs were, understandably, not designed with book and claim models in mind and, therefore, additional guardrails must be added to reduce pathways for double counting. With the increased adoption of book and claim, program operators should consider integrating components into the EPD that showcase the status of the environmental attribute.

In the absence of this broader integration with PCR, additional measures are needed when an EPD is provided to the physical recipient. The above suggestions are not comprehensive of all possible methods to reduce double counting, and stakeholders across the market should work to identify the best ways to drive credibility and transparency.





8. Appendices

Appendix A: Glossary

Below are terms commonly used within book and claim design, as well as the cement and concrete industry. While not exhaustive, this resource aims to bridge any gaps in terminology.

Term	Definition
Book and claim	Chain of custody model in which the administrative record flow is not necessarily connected to the physical flow of material or product throughout the supply chain. Book and claim decouples environmental attributes from the physical products or services that would ordinarily directly carry those attributes, creating a separate certificate (see EAC) that allows buyers to financially support the decarbonization of the associated industry and claim its benefits. *Source: Adapted from RMI and Microsoft's report* Structuring Demand for Lower-Carbon Materials *and ISO 22095-3:2026*
Certification	Official documentation proving that a person, product, project, or attribute has met a particular standard. *Source: Adapted from RMI and Microsoft's report* Structuring Demand for Lower-Carbon Materials
Clinker	A pebble-like substance produced when raw materials (limestone, clay, and sand) are quarried, ground up, combined with other materials (shale, iron ore), preheated, and then fired in a kiln to 1,500°C. A majority of the emissions associated with concrete are due to the process and combustion emissions from clinker production. *Source: Adapted from GCCA's "Policy Document on Blended Cements and Supplementary Cementitious Materials"*
Clinker ratio	The proportion of clinker in the final cement product. It is typically expressed as a percentage by mass. A lower clinker ratio indicates that a greater share of the cement is composed of filler or supplementary cementitious materials (SCMs), such as calcined clay, which generally have lower associated carbon emissions. Reducing the clinker ratio is a key decarbonization strategy for the cement and concrete sector. *Source: Adapted from GCCA's "Policy Document on Blended Cements and Supplementary Cementitious Materials"*

Double counting	The erroneous, duplicate, or improper accounting of emissions reductions arising from three main scenarios: duplicate creation of certificates for the same solution, multiple parties claiming the same certificates [at the same layer of the value chain], and repeated utilization of a single certificate by the same party for multiple purposes. *Source: Adapted from SBTi*
Double issuance	When more than one certificate or claim is created for the same environmental benefit in a book and claim system, allowing it to be sold or claimed multiple times. This undermines credibility and must be prevented through robust safeguards. *Source: Adapted from AIM Platform Quality, Accounting, and Reporting*
EAC (environmental attribute certificate)	A certificate representing the environmental attributes (including carbon intensity, GHG emissions reductions, and other sustainability characteristics that substantiate a claim) associated with a given quantity of lower-carbon product (e.g., metric ton of cement). This is also commonly referred to as a book and claim unit (BCU), credit, or token. *Source: Adapted from SBTi*
Emissions intensity	The quantity of greenhouse gas (GHG) emissions associated with producing a specific unit of product, typically expressed in terms such as kilograms of CO_2 equivalent ($kgCO_2e$) per metric ton of cement or per cubic meter of concrete. It provides a measure of the carbon footprint relative to the amount of material produced and is commonly used to evaluate and compare the environmental performance of different products or production methods. Note that on an Environmental Product Declaration (see EPD), emissions intensity is reported under the term "Global Warming Potential (GWP)," typically expressed in $kgCO_2e$ per mass or volume of product. *Source: Adapted from SBTi*
Enhanced substitution approach	An emissions accounting approach that calculates emissions reductions based on the difference in emissions intensity per functional unit between the low-carbon product represented by the EAC and the most likely alternative that would have been used in its absence. This approach attributes only the marginal emissions benefit of the lower-carbon option, rather than substituting its full emissions intensity into the purchaser's inventory. *Source: Adapted from AIM Platform Quality, Accounting, and Reporting*

EPD (Environmental Product Declaration)	A third-party verified report displaying the results of a life-cycle assessment for a specific product or group of products. Typically includes the environmental impact of the product's value chain from material extraction through manufacturing, usage, and end of life. *Source: Adapted from RMI and Microsoft's report* Structuring Demand for Lower-Carbon Materials
Functional unit	The unit in which the environmental attribute certificate is measured and denominated (e.g., clinker, cement or concrete).
GCCA (Global Cement and Concrete Association)	An international organization representing the cement and concrete industry. GCCA works with members to share knowledge, drive sustainability initiatives, and support industry standards worldwide. *Source: Global Cement and Concrete Association*
GHGP (Greenhouse Gas Protocol)	A widely used international accounting tool for government and business leaders to understand, quantify, and manage greenhouse gas (GHG) emissions. Developed by the World Resources Institute (WRI) and the World Business Council for Sustainable Development (WBCSD), it provides standards and guidance for measuring and reporting emissions across various sectors. *Source: Greenhouse Gas Protocol*
Intervention	Any action taken by an organization to address its Scope 3 greenhouse gas emissions (i.e., indirect emissions from its value chain), including, for example, monetary support for a discrete decarbonization project and the purchase of an environmental attribute certificate, regardless of the accounting approach implicated. *Source: Adapted from AIM Platform Quality, Accounting, and Reporting*
LCA (life-cycle assessment)	Assessment of environmental impact, particularly emissions, from a product's full life cycle. *Source: Adapted from ISO 14040:2006*
Masonry	Pre-cast blocks of concrete that can be used in structural applications.

Mass balance	Chain of custody model in which materials or products with a set of specified characteristics are mixed according to defined criteria with materials or products without that set of characteristics. Although the physical inputs may be mixed with other materials that do not meet the specific criteria, and cannot be discerned in the final product, certified bookkeeping allows the attribution of sustainability or GHG emission data to the final product in a manner where both the input and output are balanced over a specified period of time. *Source: Adapted from ISEAL Chain of Custody Guidance and ISO 22095-2:2026*
PCR (product category rule)	A rule that dictates how to perform an LCA for a specific product category and how to summarize the results in an EPD. PCRs are created, published, and updated by program operators (e.g., SmartEPD, NSF, EPD international, SCS Global Services, UL solutions, and others). *Source: ISO 14050:2020*
Precast	A concrete product that is mixed and cast into a mold at a production facility then delivered to a construction site. Precast products typically have a higher degree of quality control due to mixing and pouring at the same facility but traditionally include a higher cement content due to rapid production and stripping of formwork. *Source: ISO 22966:2009*
Ready-mix	A concrete product that is pre-mixed according to a specific mix design and then typically delivered to a work site to pour in place. *Source: ISO 22965-1:2007*
Registry	A trusted digital platform that ensures environmental attribute certificates (see EACs) meet standards or certification criteria and are accounted for appropriately by transparently recording certificate generation and retirement. *Source: Adapted from AIM Platform Quality, Accounting, and Reporting*
Regulatory surplus	Outcomes (i.e., emissions benefits) that go beyond what is required by law. *Source: Adapted from AIM Platform Quality, Accounting, and Reporting*

SBTi (Science Based Targets Initiative)	A global partnership that helps companies set greenhouse gas emissions reduction targets aligned with climate science. It is supported by the World Resources Institute (WRI), the World Business Council for Sustainable Development (WBCSD), and CDP, among others. SBTi provides guidelines to encourage businesses to commit to targets that contribute to limiting global warming to 1.5°C or 2°C. *Source: Adapted from Science Based Targets Initiative*
SCM (supplementary cementitious materials)	Materials that are used in blended cements to replace some or all the cement and therefore lower the emissions intensity. Traditional SCMs: fly ash, ground granulated blast-furnace slag Newer and novel SCMs: ground glass pozzolan, calcined clay, other types of fly ash (bottom ash, beneficiated ponded ash), natural pozzolans *Source: Adapted from GCCA's "Policy Document on Blended Cements and Supplementary Cementitious Materials"*
Scope 1, Scope 2, Scope 3	Scope 1: Direct emissions that occur from sources controlled or owned by an organization. Scope 2: Indirect GHG emissions associated with the purchase of electricity, heat, steam, or cooling. Scope 3: Indirect GHG emissions associated with a company's upstream or downstream activities across the value chain. *Source: Adapted from Greenhouse Gas Protocol*
Value chain	The full range of activities — including design, production, marketing, distribution, and use — linked to a particular business. In the case of cement and concrete, the value chain includes raw materials quarrying, energy supply, production and use, design, construction, buildings use, and end of life. *Source: Adapted from AIM Platform Quality, Accounting, and Reporting*

Appendix B: Documentation demonstrating utilization

	Purpose/Function	Unit	Who Uses It	When Used	Region
Bill of Lading	Legal shipping document, receipt, contract, title of goods	Cement and Concrete	Shipper, Carrier, Buyer	During shipment and delivery	US / EU
Delivery Ticket	Confirms delivery details and receipt of specific concrete batch	Concrete	Supplier, Customer	At delivery to job site	US / EU
Invoice	Requests payment for goods delivered	Cement and Concrete	Supplier, Customer	After delivery	US / EU
Declaration of Performance (DoP)	Required in the EU for cement and concrete under the Construction Products Regulation; typically issued when the product leaves the plant	Cement and Concrete	Manufacturer	During shipment and delivery	EU

Appendix C: GCCA cement band threshold for example countries (January 2026)

Note, these values are published as of January 2026 and must be updated on a recurring basis. Baseline selection must be updated in accordance with section 7.2 when new data becomes available and normalized to the applicable regional PCR. Additional guidance from GCCA would be needed to provide clarity on how to normalize for specific regions (e.g., gross vs net waste accounting).

Country	Clinker-to-cement ratio (CCR)	CCR source	Cement intensity by rating band (kg CO_2e / metric ton cement)	
			C band	B band
Global	**0.75**	**GNR – global**	**312-415**	**209-311**
Argentina	0.705	GNR – country-specific	301-400	201-300
Austria	0.689	GNR – country-specific	297-394	198-296
Brazil	0.71	GNR – country-specific	302-401	202-301
Canada	0.832	GNR – country-specific	333-443	222-332
Colombia	0.691	GNR – country-specific	297-395	198-296
Czechia	0.735	GNR – country-specific	308-410	206-307
Egypt	0.718	GNR – country-specific	304-404	202-302
France	0.768	GNR – country-specific	317-421	212-316
Germany	0.706	Country-designated	301-400	201-300
India	0.713	GNR – country-specific	303-402	202-302
Italy	0.745	GNR – country-specific	311-413	208-310
Philippines	0.702	GNR – country-specific	300-399	200-299
Poland	0.731	GNR – country-specific	307-409	205-306
Spain	0.782	GNR – country-specific	320-426	213-319
United Kingdom	0.863	GNR – country-specific GNR	341-453	228-340
United States	0.858	GNR – country-specific GNR	340-452	227-339

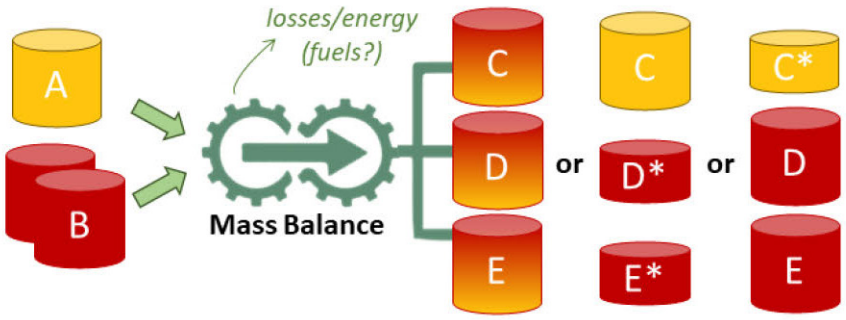
An equivalent table for the concrete threshold bands is under development; users should consult GCCA for further guidance in the meantime.

Appendix D: Comparing chain of custody models; mass balance versus book and claim

A mass balance chain of custody model allows low-carbon materials to be physically mixed with conventional materials during production or distribution. Even though these materials are combined, the quantity of inputs with specified characteristics is tracked through the system. The total amount of these inputs documented as entering the system must equal the total amount allocated to outputs, accounting for any process losses. In mass balance models, the inputs can either be proportionally allocated across all product outputs equally, or concentrated non-proportionally to a subsection of output. There has been significant debate within the environmental community about the merits and consequences of non-proportional balance, with some stakeholders taking more strict perspectives than what guidance allows for.

The landscape for mass balance standards has also been evolving. As of November 2025, ISO is finalizing a standard on chain of custody models including mass balance. The final publication is likely to come in 2026.

Exhibit A1: Mass balance model



Source: NIST, *An Assessment of Mass Balance Accounting Methods for Polymers Workshop Report*

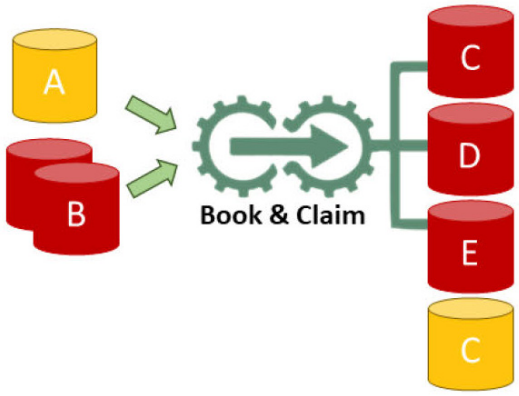
Description: The diagram illustrates how low-carbon and conventional inputs are physically mixed and accounted for using a mass balance approach. Inputs A (low-carbon) and B (conventional) enter a shared production system, where they are combined along with associated losses and energy or fuel use. Because the materials are mixed, the resulting outputs are physically indistinguishable. Two alternative mass balance accounting outcomes are shown. In the first case (C, D, and E), the emissions reduction associated with the low-carbon input is averaged across all outputs, resulting in each product carrying a proportional, partial reduction. In the second case (C, D, and E*), the same total emissions reduction is fully allocated to selected products (C), while other products receive no reduction at all (D* and E*). Although the accounting treatment differs, the physical products remain mixed and indistinguishable in both cases.*

By contrast, a book and claim system fully decouples the environmental attribute from the physical product. The environmental benefit is issued as a separate tradable unit (i.e., an EAC or certificate) that can be transferred independently of the physical product flow. The physical material can still be tracked for assurance or verification purposes, but the environmental attribute is no longer tied to the product itself.

This decoupling enables greater flexibility in how and where claims are made but also requires robust safeguards to ensure credibility and prevent double counting. While both book and claim and mass balance chain of custody

models have merit, book and claim is particularly well suited to the cement and concrete sector at this stage of decarbonization. The industry is characterized by a complex and fragmented value chain, limited availability of low-carbon production, and geographic constraints that make it difficult for buyers to directly procure low-carbon materials. A book and claim system overcomes these barriers by allowing stakeholders anywhere in the value chain to credibly support and claim the use of low-carbon cement and concrete, even if the physical materials cannot be directly procured. This makes book and claim a practical and powerful tool to channel early demand and investment toward emerging decarbonization solutions in the sector.

Exhibit A2: Book and claim model



Source: NIST, *An Assessment of Mass Balance Accounting Methods for Polymers Workshop Report*

Description: Book and claim separates the physical product flows from environmental attributes, allowing emissions reductions from low-carbon inputs to be claimed independently of the physical products delivered.

Appendix E: Regional baseline emissions sources and intensities

	Approved baseline sources and values
Clinker	
Country	*Source*: Global Cement and Concrete Association *Product types: GWP — vary by region— see GNR2.0, or latest version, and ensure the country has ≥50% estimated coverage to leverage the average GWP per metric ton of clinker.*
Cement	
United States	*Source*: American Cement Association *Product types: GWP* Portland Cement: 919 kg CO_2e per metric ton cement Portland Limestone Cement: 844 kg CO_2e per metric ton cement Blended Hydraulic Cement: 739 kg CO_2e per metric ton cement Source: 2026 Carbon Leadership Forum North American Material Baselines Weighed average hydraulic cement: 873 kg CO2e per metric ton cement
Europe	Source: Cembureau *Product types: GWP* CEM I: 803 kg CO_2e per metric ton cement CEM II:683 kg CO_2e per metric ton cement CEM III: 442 kg CO_2e per metric ton cement
Concrete	
United States	Source: National Ready Mix Concrete Association (NRMCA) *Product types: GWP — vary by strength and region — see most recent report for GWP values.*

Appendix F: Additional resources

- **Greenhouse Gas Protocol**, Corporate Value Chain (Scope 3) Accounting and Reporting Standard
- **Science-based Targets initiative**, Corporate Net-Zero Standard
- **Advanced and Indirect Mitigation Platform**, Intervention Quality, Accounting, and Reporting Standard
- **Book & Claim Community**, Principles and Best Practices for Book and Claim Systems in Heavy Transport
- **RMI**, Structuring Demand for Lower-Carbon Materials
- **U.S. Department of Energy**, Pathways to Commercial Liftoff: Low-Carbon Cement

Copyrights and Citations

Book and Claim for Cement and Concrete, Center for Green Market Activation and RMI, 2026.

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All images used are from iStock.com unless otherwise noted.

9. Addendum

The following addendum were approved by the framework Steering Committee on September 30th 2026, following a two-thirds supermajority voting process. Where relevant and easily adapted, the following changes have been integrated in line to the V1.1 framework. Where substantial adjustments would have been required, such as addendum 9.1, users should reference the materials below for additional information.

9.1 SCM Issuance Pathway

9.1.1 Context

Under the V.1.0 Framework version released in January 2026, Environmental Attribute Certificate (EAC) issuance was limited to producers of clinker, cement, or concrete. As a result, supplementary cementitious materials (SCMs) would only be eligible to issue an EAC if they either meet a qualifying cement certification or are incorporated into a blended cement or concrete product. As stated in section 2.1, this decision was made to recognize the physical replacement limitation of SCMs, which cannot displace 100% of clinker in a blended cement or concrete and likely only constitute a portion of the cementitious content in a blended product.

While SCMs are supported under the current framework through blending in cement or concrete products, multiple stakeholders within the Working Group and Steering Committee raised concerns that requiring an SCM producer to partner with a downstream party to issue an EAC would likely reduce investment in SCM production. Specifically, novel SCM producers may be unable to secure long-term offtake agreements necessary to secure the capital to finance project development. At the same time, there has been a broad recognition among Working Group and Steering Committee members that SCMs, including novel SCMs, represent a critical pathway to decarbonize the cement and concrete industry. Direct SCM issuance of EACs could therefore provide a pathway for SCM producers to introduce decarbonized products into the market more rapidly.

Based on these dynamics, the Organizers engaged in a 6-month process to explore how and whether additional guidance could be added to this framework to enable direct issuance from SCM producers while maintaining environmental integrity and book and claim accounting best practices. This process resulted in the passage of this addendum by the same Steering Committee that approved the framework document. While this addendum does provide a pathway for SCM producers to issue EACs directly, it does not prevent cement and concrete producers that have used SCMs to produce a blended cement from issuing EACs in accordance with the framework and any additional addendums.

9.1.2 Addendum Overview

This addendum outlines the rules for SCM producers to issue EACs directly, prior to the product being blended and utilized in either a cement or concrete mix. This additional issuance pathway remains consistent with the existing framework. This addendum does not repeat all requirements and guidance but rather expands on the existing framework to clarify considerations specific to this new pathway. Where new guidance is not explicitly outlined in this addendum, users should defer to the existing framework.

The following sections outline the components that are expanded or adjusted from the prior version of the framework to enable direct SCM EAC issuance. The sections are tied to those of the existing framework, reorganized for clarity.

9.1.3 Functional Unit

The process for SCM producers to issue EACs directly exists as a sub-method of the cement functional unit. SCM producers must establish the maximum clinker replacement rate for the SCM and calculate the GWP of the "cement-equivalent product" based on a blend of the SCM at its maximum replacement rate with market average Ordinary Portland Cement (OPC). The replacement rate of the SCM reflects the practical limitation of SCMs to fully replace clinker in a cement or concrete application. Addendum Section 9.1.4 provides additional guidance on determining the maximum replacement rate, leveraging the same certification process that is used for blended or alternative cements.

The objective of the conversion from SCM to cement equivalence via the implied cement GWP is to enable all cement EACs, including those derived from an SCM, to be accounted for consistently within a single contractual ledger and eligibility framework. This approach supports consistent accounting and reporting while addressing the absence of a GCCA rating system specifically designed for SCMs.

9.1.4 Emissions intensity measurement methodology

An EAC derived from an SCM must contain all underlying information on the SCM, including but not limited to, the GWP as reported by a product-specific, 3rd party verified Type III EPD, replacement rate, mass of SCM issuing, and the calculated cement-equivalent product mass, GWP, and assumptions.

The cement-equivalent product is calculated using the SCM GWP, market OPC GWP, and replacement rate, or percent (%) by mass, of the SCM as determined by the eligible C1157-blend. In order to establish the converted characteristics of the cement-equivalent product, a producer must calculate both (1) the GWP of 1 metric ton of the cement equivalent product and (2) the quantity (in metric tons) of the cement equivalent product based on the quantity (in metric tons) of the SCM for which EACs are being issued.

1. To calculate the GWP of 1 metric ton of the cement-equivalent product, the following equation should be used:

$$GWP_{SCM} \times RR_{SCM} + GWP_{OPC} \times (1 - RR_{SCM}) = GWP_{cement\text{-}equivalent\ product}$$

2. To calculate the quantity (in metric tons) of the cement-equivalent product based on the quantity (in metric tons) of the SCM for which EACs are being issued, the following equation should be used:

$$\frac{Quantity_{SCM}}{RR_{SCM}} = Quantity_{cement\text{-}equivalent\ product}$$

***GWP_{SCM}**: SCM emissions intensity from verified EPD*
***RR_{SCM}**: maximum replacement rate of SCM (see below for more details on calculation methodology)*
***GWP_{OPC}**: Emissions intensity of average market OPC[2]*

The EAC must retain all relevant information on the underlying SCM, but be denominated in metric tons of the cement-equivalent product.

2 Average market OPC GWP should follow Framework Appendix E where data sources available, namely American Cement Association for the United States and Cembureau for the European Union. For countries without regional data, average market OPC GWP can be determined by median GCCA band F for the region, assuming a 95% clinker factor, consistent with the definition of OPC and the incorporation of minor constituents such as gypsum.

Determining the SCM emissions intensity (GWP)

The GWP of SCMs must be calculated consistent with the most relevant and applicable PCR of the production jurisdiction, demonstrated with a third-party verified product-specific Type III EPD. In North America, for example, producers should use the SmartEPD Part B PCR for Supplementary Cementitious Materials Standard 1000-002. In regions that do not have SCM-specific PCRs, producers must calculate GWP by performing a life cycle assessment (LCA) in accordance with broader PCR guidance, for example EN 15804. If or when complementary PCRs ("c-PCRs") are adopted for specific SCM products, these must be adhered to.

Determining the SCM replacement rate (RR)

The replacement rate must be determined by achieving ASTM C1157 blended cement certification of a product consisting of only the applicable SCM and OPC / clinker. No other SCMs may be included in the blended product. The issuer of the SCM must demonstrate that the mix at the specified replacement rate achieved the C1157 – General Use certification. The replacement rate must be validated by a third party to match the underlying mix of the product that received C1157 certification. This may be performed by the same verifier conducting the C1157 certification.

The methodology uses the maximum replacement rate of the SCM for two primary reasons. First, because the EAC is issued before the SCM is blended into a cement or concrete, there is no way to determine the final blending rate. Further, data on average blending rates remains opaque with no definitive, agreed-upon source for average blending rate by SCM. Second, even if the SCM product is ultimately blended at a lower replacement rate, the total clinker displacement and resulting GWP impact will remain the same. This approach is consistent with alternative cements that have met the ASTM C-1157 certification but may subsequently be down-blended in the final concrete product.

Identifying emissions intensity of OPC

The GWP of the OPC must reflect the average market emissions intensity and may not include additional SCMs. The OPC GWP selection should follow the same process as outlined in the Framework for baseline selection for products with no SCM incorporation. In the US, for example, this would be the ACA OPC baseline.

A company- or facility-specific EPD may not be used for the OPC GWP when calculating the GWP for the cement equivalent GWP. If the cement-equivalent GWP used a facility-specific EPD value for OPC GWP, the physical product that incorporates OPC could no longer use that GWP without resulting in double counting.

Example

*An SCM producer in the US wants to issue EACs from 100 metric tons of an SCM. That SCM has an emissions intensity of 100kgCO2e/metric ton. The SCM was blended with OPC with a replacement rate of 60% by mass, meaning 60% of the blended product was the SCM, as determined through ASTM C1157- General Use certification. The SCM is produced in the US, which uses the market OPC baseline of 919kgCO2e/metric ton. The resulting GWP of the cement-equivalent product would be 60%*100 + 40%*919 = 428kgCO2e/metric ton. This is within the regionalized US GCCA band C, and eligible for issuance (see section 9.1.5). The resulting cement-equivalence product would also have an adjusted mass, derived using the replacement rate: 100 / 60% = 167 metric tons. In summary, 100 metric ton of SCM with GWP of 100kgCO2e/metric ton and replacement rate of 60% issues 167 metric ton of cement-equivalent product EACs with a GWP of approximately 428 kgCO2e/metric ton.*

9.1.5 Eligibility

The cement-equivalent product GWP determined in section 9.1.4 must be evaluated against the regionalized GCCA bands to determine eligibility of the SCM to issue EACs. Producers must adhere to the cement eligibility requirements established within the framework. If the cement-equivalent product GWP does not meet the eligibility threshold, the product may not issue EACs.

Given the widespread adoption, cost savings, and interaction with fossil fuel-burning industrial processes, non-activated and non-beneficiated fly ash and ground granulated blast furnace slag (GGBFS) are not eligible for EAC issuance under this pathway.

To further reduce emissions impact of the primary binder when using SCMs, purchasers should pair EACs generated from SCMs with EACs from OPC or clinker. See section 9.1.7 for more details.

9.1.6 EAC issuance and data tracking

EAC from SCMs must adhere to the same issuance criteria set forth in the framework, namely, that the product must be proven to have been sold or distributed from the producers facility as demonstrated by a bill of sale or other qualifying documentation described in Framework section 5.1.

The certificate must include all information outlined in the Framework, as well as the following:

- Cement-equivalent product quantity (mass)
- Cement-equivalent product GWP
- SCM replacement rate, as determined through blended cement certification or prescriptive standard
- Verification of replacement rate, if needed beyond certification or standard documentation
- Documentation of blended cement certification, if applicable

9.1.7 EAC accounting

Companies accounting for EAC issued directly from SCMs in a contractual ledger should use the cement-equivalent product GWP and quantity rather than the underlying SCM quantities. The cement-equivalent product GWP should be accounted for in the same manner as described in the Framework under the cement functional unit.

If making an adjustment to the emissions intensity when substituting in the contractual ledger, the baseline should follow the guidance outlined in the Framework for the cement functional unit. This adjustment should be performed for the cement equivalent GWP outlined on the certificate, rather than the underlying SCM GWP.

To address emissions from the OPC portion of the cement-equivalent product calculation, reporting companies may also purchase clinker or OPC EACs. The GWP of the OPC EAC may then be substituted for the market average GWP of the OPC in the cement-equivalent product line item of the contractual ledger, following the same approaches outlined in the Framework. EACs used to address the clinker or OPC in this manner must originate from compositionally equivalent clinker or OPC products, and may not come from alternative or blended cements.

9.1.8 Physical recipients of products with sold EACs

SCM producers must require that their downstream customers of the physical SCM use a market OPC baseline GWP for corporate inventory accounting and reporting. Purchasers of SCMs that have sold their environmental attribute must use OPC GWP, rather than blended cement, as a conservative measure given the uncertainty in what types of products the SCM will be blended with. For example, in the EU, purchasers of an SCM that has decoupled its EAC should use the 803kgCO2e/t when calculating the product's GWP, as described for the CEM I Cembureau benchmark.

Disclosure of the adjusted emissions intensity for the SCM should follow the same description as outlined in the Framework, including providing details in the notes section of a downstream EPD and a cover page associated with the product EPD. Producers should also work with EPD partners to help integrate book and claim reporting into existing and new tools to reduce risk of double counting.

Note: *In determining the baseline OPC for the cement equivalent product calculation in 9.1.4, information was provided to highlight that GCCA band F may be more representative of likely average cement emissions intensity than band E. Band E is described as "good practice" reference threshold, which is still significantly lower than reference data from ACA and CEM I. As a result, adoption of this addendum will also include updating the baseline cement decision process in section 7. Accounting Baseline of the Framework to utilize top of band E instead of D if relevant regional data is not available. Using band E will still be a "conservative" estimate of the baseline, as it represents good practice instead of average.*

9.2 Limits on GGBFS and fly ash in cement and concrete EAC

Section 3.3 of the V.1.0 Framework version urged market participants to prioritize solutions that are catalytic and to avoid the use of traditional products such as GGBFS and fly ash. Section 3.3 previously stated, "*EACs should not be issued for blended cements or concretes for which non-beneficiated or non-activated traditional SCMs, defined as fly ash from coal-fired power plants or GGBFS, represent the primary driver of emissions reductions relative to the appropriate baseline for the cement or concrete mix.*"

Alongside the development of the SCM eligibility pathway, an addendum was passed that requires non-beneficiated, non-activated GGBFS and fly ash not be the primary driver of decarbonization, moving from the suggestion previously included. It also provides details on how to define eligibility. See the revised section 3.3 for more details.

9.3 Extension of emissions intensity eligibility

Alongside the required limit to GGBFS and fly ash articulated in 9.2, the eligibility of GCCA C-rated products was extended from 2030 to 2035 between the V.1.0 and V.1.1 iterations of this framework. This update enables novel producers additional runway to scale and refine technologies that have not yet reached their full decarbonization potential. It allows the producers to sign long term agreements that may extend into the new decade, supporting the development of new facilities that the current framework timeline may not.

Because reliance of non-beneficiated, non-activated GGBFS and fly ash to issue an EAC has been materially reduced in addendum 9.2, the risk of EACs being issued from business-as-usual C-rated products is also significantly lowered.

Implemented alongside addendum 9.2, extending the eligibility of C-rated products that limit GGBFS and fly ash and depend on novel technologies can support clinker alternatives while also limiting potential issuance from traditionally available products.

Framework Statements of Support

"Despite growing corporate ambition and investment in Scope 3 climate targets, most value chains remain opaque, and practical guidance for action is still limited. These challenges are especially acute in complex materials sectors like cement and concrete, where physical procurement for low-carbon products is constrained. This book and claim framework provides additional guardrails for high-integrity environmental attributes, expanding upon the AIM Standard to provide sector-specific guidance to the industry. The framework will support companies in allocating resources towards real-world, verifiable, catalytic emissions benefits to cement and concrete value chains."

- AIM Platform

"As a buyer with a complex, global value chain, we see book and claim systems like the one developed by GMA and RMI as essential to decarbonizing our cement and concrete inventory. Working alongside industry peers to support its development underscores the collective value of this framework. It provides the credibility needed to ensure that our investments are tied to real, measurable emissions reductions while helping unlock the signals necessary to scale lower carbon cement and concrete solutions."

- Chris Atkins, Director, Worldwide Operations Sustainability, Amazon

"Book-and-claim is a proven framework for unlocking scalable, credible markets for sustainable materials. With demand already there, tools like book-and-claim give innovators like Brimstone a faster path to help customers lower emissions, deploy materials in infrastructure projects at scale, and drive the industry forward."

- Adam DiNardo, Head of Strategy & Business Development, Brimstone

"Fortera is enthusiastic about the implementation of the Book and Claim framework for low-carbon cement and concrete, having worked alongside industry leaders to shape the approach through an initiative convened by the Center for Green Market Activation and the RMI. This framework establishes verifiable demand for high-impact solutions like our low-carbon ReAct® cement products, connecting end users pursuing ambitious climate commitments with our regional production, while maintaining the traceability and integrity essential to credible climate action, and driving the investment needed to support deployment and ensure wide availability."

- Andreas Marcotty, Director, Strategic Growth, Fortera

"We support the Concrete Book and Claim Framework as a important step toward creating actionable, low-carbon solutions for the construction industry. This type of cross-industry collaboration is essential for advancing innovation and transforming high-impact sectors like construction through novel market instruments."

-Noah Goldstein, PhD, Google Sustainable Data Center Construction Lead

"Robust, transparent industry standards and frameworks are crucial for new market mechanisms such as Book and Claim to help to connect buyers and producers of low-carbon cement and concrete. We look forward to further contribute to the development of such important frameworks as an important tool to support the implementation of breakthrough technologies like CCS and to enable the sector's transition towards net-zero."

- Christian Artelt, Senior Manager Sustainable Construction & Public Affairs, Heidelberg Materials

"Holcim welcomes the intent of the book-and-claim framework developed by GMA and RMI for the cement and concrete sector, which aims to help channel investment toward further decarbonization efforts. Holcim's strategy remains focused on scaling its sustainable offering to meet customer demand and delivering tangible emissions reductions, including through deep decarbonization action and the deployment of breakthrough technologies. Holcim will continue to follow and engage in discussions around the framework's evolution, with a focus on credibility, integrity, and transparency."

- Holcim

"Scaling production of novel low-carbon materials like Sublime Cement® requires bankable offtake agreements to attract investors long before reaching FID for new facilities. An innovative book and claim model and framework developed by RMI and GMA makes this possible. Their tireless work convening the entire concrete value chain has resulted in a framework that will make cement EACs verifiable, trusted, and capable of reducing corporate supply chain emissions while accelerating the scale-up of manufacturers who are here to meet that need."

- Cory Waltrip, Director, Business Development & Strategy, Sublime Systems