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March 9, 2026

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**Subject: The California Cement Industry's Comments on Proposed Amendments to the California Cap-and-Invest Program**

The Coalition for Sustainable Cement Manufacturing & Environment ("CSCME") offers these comments on the January 20, 2026 California Air Resources Board's ("CARB") Proposed Amendments to the Regulation for the California Cap on Greenhouse Gas Emissions and Market-Based Compliance Mechanisms ("Proposed Amendments").

CSCME is a coalition of all five cement manufacturers in California.[1] As described in the industry's roadmap to net carbon neutrality, we support the state's greenhouse gas ("GHG") reduction goals and are committed to achieving carbon neutrality by 2045.[2] That commitment is backed by nearly two decades of working cooperatively and constructively with legislators and regulators to develop policies that advance the state's climate goals and promote the technologically feasible and cost-effective reduction of GHG emissions while minimizing the risk of economic and emissions leakage. Those efforts include:

- Working with CARB on the design and implementation of the Cap-and-Invest ("C&I") program.
- Supporting the passage of AB 398, which extended the program to 2030.
- Supporting the passage of AB 1207, which extended the program to 2045.

CSCME also worked closely with the legislature, environmental advocacy groups, and other interested stakeholders to develop and support the passage of SB 596. Supported by supermajorities in both the Assembly and the Senate, SB 596 recognized the unique challenges associated with achieving carbon neutrality in the California cement industry and established a statutory basis for enacting cement-specific tools within the C&I program that remove barriers to deep decarbonization and minimize the risk of leakage, including a border carbon adjustment.[3]

The C&I program is essential to achieving those goals, and the Proposed Amendments represent the most significant restructuring of the C&I program since its inception. They will shape the competitive and decarbonization landscape for "hard-to-decarbonize" industries, such as cement, for decades to come.

Given the stakes, CSCME has prepared these detailed comments to ensure the administrative record reflects the cement industry's unique structural challenges and offer constructive recommendations that will materially strengthen the Proposed Amendments and better align the C&I program with statutory goals and directives.

We look forward to continuing to work with CARB to strengthen the C&I program and close the gap between the state's climate ambitions and the practical realities associated with achieving net carbon neutrality in hard-to-decarbonize industries, such as cement.

Sincerely,

Steve Coppinger
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# Executive Summary

## Why the California Cement Industry is Unique

The California cement industry is structurally distinct within the C&I program. It is extremely GHG-intensive, directly trade exposed, and dominated by process emissions that cannot be eliminated through conventional electrification or fuel switching.

Cement manufacturing has a high GHG intensity (i.e., GHG emissions per dollar of value added) due to both high energy inputs and process emissions. Carbon costs therefore represent a material share of total production costs. Small changes in allowance price or allocation structure have disproportionate competitive effects on the cement industry compared to other sectors.

At the same time, cement competes directly with imports from jurisdictions that do not impose comparable carbon costs, including China, Vietnam, Thailand, and Mexico. As compliance obligations rise and free allocations decline, the competitive gap widens. Meanwhile, demand for cement simply shifts toward imported material.

Finally, roughly two-thirds of the cement industry's GHG emissions are process emissions. These emissions are inherent to the chemistry of clinker production. Deep decarbonization will require structural solutions such as carbon capture, utilization, and storage, which is an extremely capital-intensive and long-term investment.

These three characteristics — high GHG intensity, trade exposure, and process-emissions dominance — make cement uniquely sensitive to carbon price asymmetry and uniquely dependent on leakage protection, policy predictability, and durable public investments in decarbonization projects.

## The State of the California Cement Industry

California's cement industry supports the State's climate goals and has reduced its absolute GHG emissions and GHG emissions intensity over time. However, the sector faces increasing structural pressures in which climate policy could be the proverbial "straw that broke the camel's back". Those pressures include:

- Rising import penetration.
- Declining allowance allocations.
- Escalating allowance prices.
- Barriers to permitting decarbonization projects.[4]
- Broader economic uncertainty and policy whiplash.

The net allowance position of cement producers is tightening just as the industry must undertake the largest capital transformation in its history. Without targeted adjustments, the Proposed

Amendments risk increasing leakage and withdrawing capital from the industry at exactly the time that it is needed to unlock transformational investment.

## Closing the Carbon Loophole & Leveling the Playing Field

California producers bear carbon costs that imported cement does not. As allowance allocations decline in the absence of a functional, incremental border carbon adjustment mechanism, this asymmetry intensifies. The result is a structural carbon loophole that favors imports and shifts production and investment outside the state's climate policy frameworks.

Import reporting is a necessary first step toward a border carbon adjustment ("BCA"). However, reporting alone does not address the immediate competitive imbalance. Leakage protection should not erode faster than border measures are implemented. Absent interim safeguards or a clear BCA timeline, the program risks accelerating import substitution rather than reducing global emissions. Accordingly, the allowance allocation rate per unit of output should be paused, via a pause in cap adjustment factors ("CAFs"), unless and until an effective incremental border carbon adjustment can be put in place.

## The Need for CCUS

Because cement's emissions are predominantly process-based, CCUS is indispensable to achieving net-zero. Material substitution and efficiency gains are important but insufficient. Deep reductions require capture infrastructure, transport networks, and long-term storage capacity. These projects involve substantial capital investment and multi-year development timelines.

Financing such investments requires durable policy signals and predictable value streams. If allowance allocation declines and incentive structures lack stability, CCUS deployment will stall. The regulatory framework must align leakage protection, carbon pricing, and investment incentives to support large-scale capture projects.

## Proposed Changes to the Allowance Allocation System for Cement

The continued decline of CAFs, absent border protections, increases leakage risk at the worst possible moment. The allowance allocation system should:

- Prevent erosion of leakage protection before a BCA is operational.
- Preserve alignment between allocation and emissions intensity.
- Provide sufficient stability to support long-term investment planning.

Free allocation is most important for high leakage risk and hard-to-decarbonize industries. Cement squarely fits that definition, and policy should look for opportunities to reflect and reinforce that critical distinction. The Proposed Amendments fall short in that respect.

## The Manufacturing Decarbonization Incentive

The Manufacturing Decarbonization Incentive ("MDI") is a new and innovative program feature. CARB's willingness to dedicate allowance value to industrial decarbonization is significant. However, as currently designed, the MDI is unlikely to support transformational cement investments. The scale, durability, and structure of the program are not yet aligned with the realities of multi-year, capital-intensive projects. As a result, the vast majority of MDI assistance is either inaccessible by or unusable for large cement decarbonization investments.

## Industrial Allowance Allocation for SCM Producers

By allocating allowances to supplementary cementitious material ("SCM") producers, the Proposed Amendments seek to recognize the important role that SCMs will play in decarbonizing the cement value chain. Encouraging clinker substitution is sound climate policy.

However, CARB has repeatedly affirmed that allowance allocations are designed to minimize leakage risk. SCM producers are not exposed to leakage. By their very nature, they do not have a significant GHG intensity and, therefore, do not face a material carbon cost burden. Moreover, providing allowance allocations directly to SCM producers simply undermines the upstream blending that CARB is trying to encourage by expanding the definition of cement output to include SCMs. To the extent that CARB sees a need to provide greater incentives to increase SCM blending downstream of cement manufacturers, it should consider policy mechanisms other than those reserved for leakage protection (i.e., industrial allowance allocation).

## Import Reporting Requirements

Expanded import reporting is an important step toward transparency and future border adjustment design. However, if the framework is to support a future BCA, definitions and methodologies must be carefully crafted and precise, similar to the verification process required under the Mandatory Reporting Regulation ("MRR"). If the data collected today are to serve as the basis for compliance-grade policy tomorrow, the structure must be rigorous from inception. Ambiguity or misalignment will undermine future implementation and can put domestic cement at risk for leakage.

## Conclusion

The Proposed Amendments include meaningful steps forward, including modernization of cement-related definitions and creation of the MDI. However, taken as a whole and with respect to the California cement industry, the package misses the mark by increasing carbon cost exposure while providing insufficient structural support for deep industrial decarbonization.

Cement's decarbonization pathway depends on preserving in-state production capacity while enabling long-lived, capital-intensive investment. Closing the carbon loophole, stabilizing leakage

protection, and strengthening long-term investment signals are necessary to achieve both climate ambition and industrial viability.

Without that alignment, California will merely shift GHG emissions rather than reducing them.

## Summary of Recommendations

### *Cross-Cutting*

- Pause CAF declines for high leakage risk and hard-to-decarbonize industries, including the cement industry, until a proven incremental BCA is operational.

### *Closing the Carbon Loophole (Section 3)*

- Implement an incremental BCA framework for imported cement without further delay, consistent with the mandates of SB 596, AB 32, and AB 398.
- Adopt a two-phase approach that establishes a practical, defensible interim framework immediately, using conservative default emissions factors where facility-specific data is unavailable, while expanding and refining the program over time.
- Recognize that a BCA and the allowance allocation framework are complementary tools that must work in concert to effectively minimize leakage risk.

### *Carbon Capture, Utilization & Storage (Section 4)*

- Establish clear accounting rules that recognize captured and permanently stored $CO_2$ for purposes of reducing a facility's compliance obligation under the C&I program.
- Formally recognize that capturing and storing $CO_2$ that originates from biomass fuel combustion is a net carbon negative outcome.
- Include CCUS among the activities eligible for MDI funding, at minimum for pre-investment activities such as engineering studies, site characterization, permitting, and front-end engineering design.
- Signal that the C&I program will evolve to support CCUS deployment with a clear statement of intent and a timeline for developing accounting rules and incentive provisions.

### *Allowance Allocation System (Section 5)*

- Adopt the expanded benchmark for finished cement that encompasses SCMs. This change is sound in principle and design and should be adopted as proposed.
- Maintain assistance factors at 100% while addressing the program's failure to differentiate leakage protection across risk categories through complementary mechanisms, particularly the CAF, a BCA, and the MDI.

- Support the transfer of indirect electricity allocation to CARB as a logical simplification that ensures consistent leakage protection across all covered facilities, provided that it maintains the overall amount of allowance value for a facility.

### *Manufacturing Decarbonization Incentive (Section 6)*

- Expand the scope of eligible activities to include CCUS, production of lower-clinker cement, equipment for expanded biomass uses, investments in industrial waste heat recovery, and other decarbonization pathways relevant to the cement industry.
- Broaden qualifying expenditures to include the full range of costs attributable to planning, developing, implementing, and operating eligible projects, including capital expenditures and pre-investment activities.
- Invert the MDI modifier structure so that the higher modifier currently assigned to standard industries applies to industries classified as hard-to-decarbonize, and vice versa.
- Replace recurring eligibility applications with a durable, one-time application process supported by the existing return-of-allowances accountability mechanism.
- Align use and repayment timelines with project readiness by triggering the five-year spending window when a facility activates MDI allowance value rather than when it is initially allocated, and separately track MDI allowances within Compliance Instrument Tracking System Service ("CITSS") to preserve the investment signal.
- Eliminate the rolling historical baseline applied to biomass procurement, which penalizes early adopters and treats biomass differently from every other MDI pathway.
- Preserve and redeploy unused MDI allowance value through a dedicated redeployment pool rather than permanently removing it from the program.

### *Industrial Allowance Allocation for SCM Producers (Section 7)*

- Do not extend industrial allowance allocation to SCM producers. SCM production does not meet the leakage-risk criteria that justify industrial allocation, and extending allocation to SCM producers undermines the incentive for upstream blending that the expanded cement definition is intended to create.
- Explore alternative, demand-side policy mechanisms to increase blended cement adoption downstream, such as procurement standards, carbon intensity disclosure requirements, or targeted demand incentives.

### *Import Reporting Requirements (Section 8)*

- Adopt a components-based default methodology that decomposes the GHG footprint of imported cement into process emissions, kiln combustion emissions, non-kiln combustion

emissions, electricity-related emissions, and transportation-related emissions, with separate default factors for each component.

- Include transportation-related emissions in the reporting scope by requiring importers to report the port of origin and mode of transportation for all cement and clinker imports.
- Establish a data quality assurance mechanism for facility-specific CEI reporting that, at a minimum, requires supporting documentation and attestation and provides CARB with the authority to review and challenge reported values.
- Clarify the definition of "importer of cement" to address potential ambiguities involving intermediate ownership transfers, consignment arrangements, and downstream purchasers who may not be well-positioned to report upstream manufacturing data.
- Explicitly link the reporting framework to a BCA implementation timeline, making clear in the regulatory record that import reporting is a precursor to a compliance-based BCA.

## Section 1. Why the California Cement Industry is Unique

The California cement industry is a "hard-to-decarbonize" industry, as recognized by CARB in the 2022 Scoping Plan and confirmed by CARB in the Draft SB 596 Cement Strategy.[5,6]

This hard-to-decarbonize designation distinguishes cement from all other major California industries.[7] It is based on a rare combination of factors:

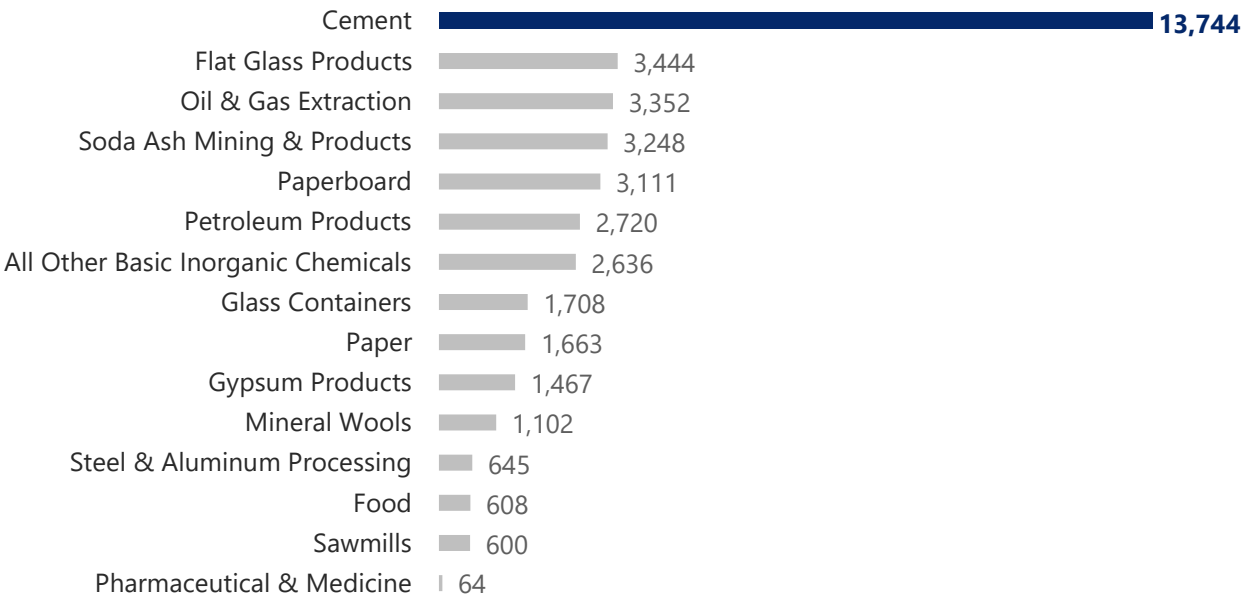
- An exceptionally high GHG emissions intensity.
- A dominant share of process emissions.
- A high exposure to imports.

Individually, each factor presents a formidable challenge. Collectively, they create a virtually intractable landscape to achieving deep decarbonization while also minimizing economic and emissions leakage.

### 1.1 Exceptionally High GHG Emissions Intensity

As noted in CARB's Appendix K leakage analysis, the cement industry has one of the highest GHG intensities among all manufacturing industries, as measured by GHG emissions per dollar of economic value added.[8] As illustrated in Figure 1, this GHG intensity is multiple times greater than any other major emitting California industry.

**Figure 1. GHG Intensity by Major Emitters in the Manufacturing Sector***
GHG Emissions per Million $ of Value Added



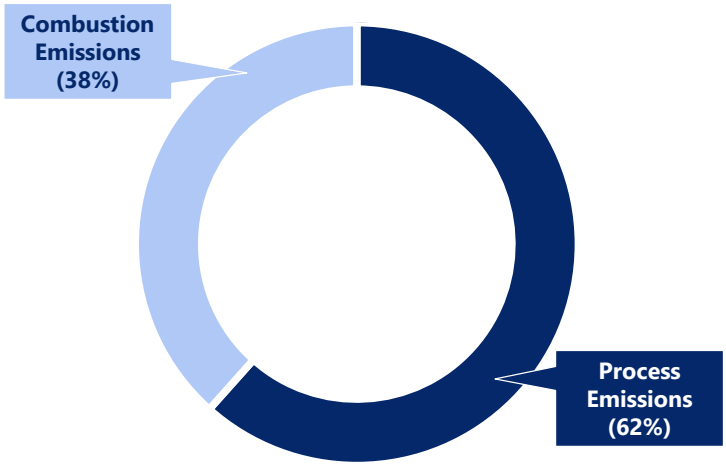

*Sources: CARB (2010). Initial Statement of Reasons. Appendix K.*
**Excludes industries with less than 60,000 MT of GHG emissions in 2022.*

The cement industry's extreme emissions intensity is the cornerstone of its hard-to-decarbonize status. Simply put, the higher an industry's GHG intensity, the higher the compliance cost burden associated with carbon pricing mechanisms, such as the C&I program.[9] For a sector like cement, even modest increases in carbon costs can have a devastating effect on a producer's economic viability. This dynamic is fundamentally different than industries that have a much lower GHG intensity, and it underscores the importance of reflecting the industry's hard-to-decarbonize status into program design choices whenever possible.

## 1.2 A Dominant Share of Process Emissions

The second defining feature of the cement industry's decarbonization challenge is the overwhelming dominance of process emissions — that is, GHG emissions that result from the chemical transformation of limestone into clinker, as opposed to fuel combustion. As noted by CARB, process emissions represent almost two-thirds of the California cement industry's direct GHG footprint.[10] Put differently, even if the California cement industry were to transition entirely to zero-carbon energy tomorrow, it would only reduce one-third of its direct GHG footprint.

**Figure 2. California Cement Industry: Emissions Profile**
Percent of Direct Covered GHG Emissions by Type, 2023




*Sources: CARB (2025). GHG Inventory (2025 Edition; 2000-2023).*

The implications of this fact cannot be overstated. For every other major California industry, the primary decarbonization pathway involves reducing combustion-related GHG emissions, whether through electrification, fuel switching, or efficiency improvements. For the cement industry, those pathways are necessary but grossly insufficient. As a result, the cement industry has limited cost-effective abatement opportunities, and it is destined to effectively be a "carbon price taker" until transformative abatement measures that address process emissions — such as carbon capture, utilization, and sequestration ("CCUS") — are commercially available, policy enabled, and economically viable.

## 1.3 Extreme Exposure to Import Competition

The third feature that defines the cement industry's position is its vulnerability to imports, which in turn is based on a series of factors, including but not limited to:

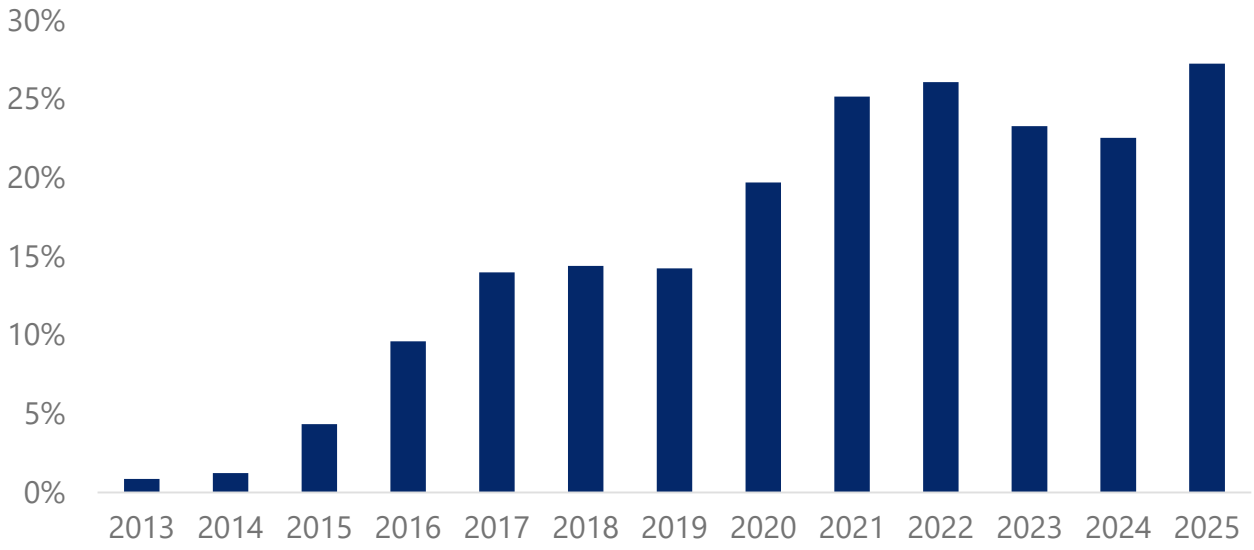
- Cement is a fungible commodity that competes almost exclusively on the basis of price.

- Cement can be economically transported long distances by sea.
- California has multiple deep-water ports that are easily accessible to distant Asian nations.

This combination of factors exposes the California market to importers that seek to exploit the cost pressures created by the C&I program.

As illustrated in Figure 3, California cement imports as a share of apparent consumption have increased from less than 1% at the beginning of the program to more than 27% in 2025.[11,12] Unlike prior cycles in which imports tended to grow alongside demand, this cycle is distinctly different. For instance, between 2020 and 2025, cement imports increased by roughly 15% (2.0 MMT to 2.3 MMT) while apparent cement consumption decreased by almost 20% (10.3 MMT to 8.3 MMT). This combination of increasing imports from distant nations and shrinking demand in California, especially in an industry like cement in which transportation economics are often decisive, suggests that there is a fundamental imbalance in the market and should serve as a warning sign to CARB that it needs to close the carbon loophole for imports as quickly as possible.

**Figure 3. Market Share of Foreign Imports in California**
Foreign Imports as a Share of Apparent Consumption, 2013-2025*




*Sources: International Trade Commission (2025). Dataweb, Imports for Consumption (1st Unit of Quantity) to CA customs districts (San Francisco, Los Angeles, San Diego), Jan 2013-Dec 2025. USGS (2025). Cement Minerals Yearbook, Table 9 (2000-2023); USGS (2025). Cement Minerals Industry Survey, Table 2a & Table 2b (Nov 2025 release).*

**2025 market share of foreign imports as a share of apparent consumption calculated using annualized YTD apparent consumption (Jan–Nov) and full year 2025 import quantity.*

## 1.4 Policy Considerations & Implications

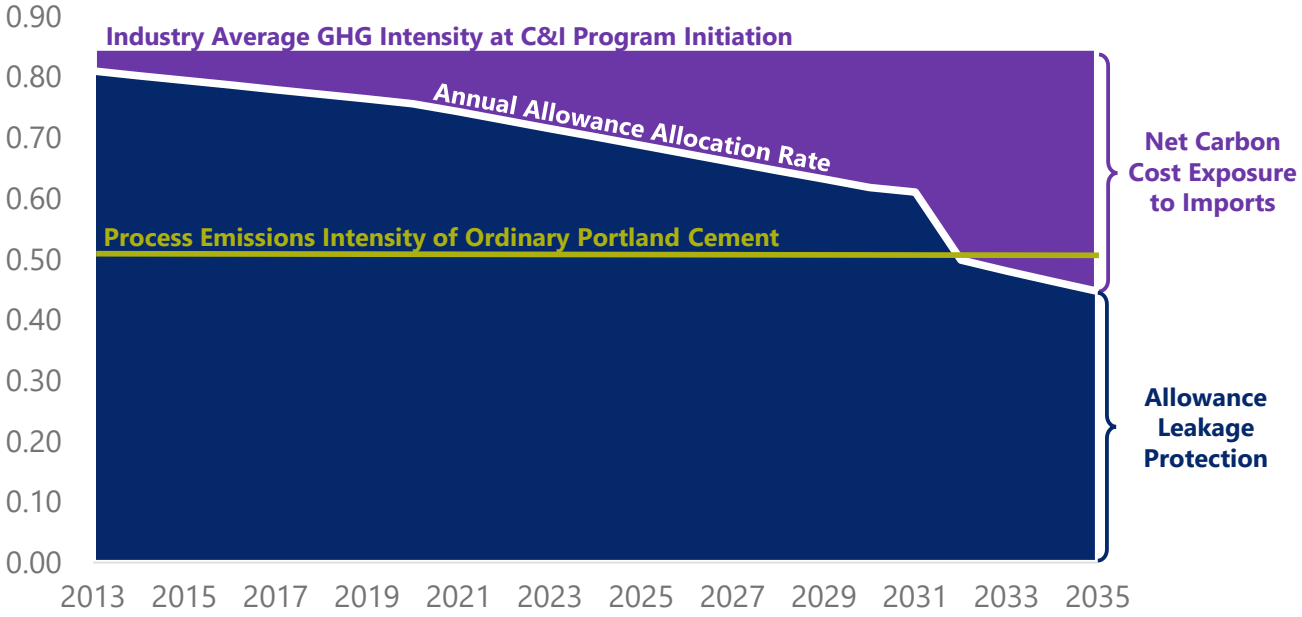
An industry with any one of these three factors would face significant challenges under the C&I program. Many industrial sectors are trade exposed. Some have a high GHG intensity, albeit not

nearly as high as cement. And a handful have significant process emissions. But the cement industry is the only major industry that sits at the nexus of all three factors, which places it in a class of its own with respect to leakage risk.

CARB nodded to that distinction at the outset of the program by applying CAFs to hard-to-decarbonize industries that decline at half the rate of other industries. Since that time, however, the program's approach to minimizing leakage risk in the cement industry has not evolved fast enough to keep pace with changing circumstances.

For instance, as shown in Figure 4, the industry's annual allowance allocation rate (i.e., leakage protection) has continued to decline despite the fact that the GHG emissions associated with imported cement remain unregulated. Due to the combination of this withdrawal of leakage protection and increasing allowance prices, the industry's net carbon cost exposure to imports has steadily grown, and is rapidly approaching unsustainable levels.

**Figure 4. Withdrawal of Leakage Protection for the Cement Industry**
Annual Allowance Allocation Rate per MT of Cement, 2013-2035




*Sources: CARB (2026). Proposed Amendments to the California Cap on Greenhouse Gas Emissions and Market-Based Compliance Mechanisms Regulation, Appendix A-1: Proposed Regulation Order; CARB (2010) Development of Product Benchmarks for Allowance Allocation, Figure 6; Process emissions intensity of OPC assumes a process emissions factor of 0.547 per MT of clinker and clinker-to-cement ratio of 92%.*

Importantly, the true magnitude of this cost exposure is larger than it appears. An industry's carbon costs under the C&I program show up on two distinct ledgers.

(1) The C&I program ledger, which captures the costs associated with compliance obligations paid (i.e., emissions) net of allowances received. This balance on this ledger is readily visible and easily quantified.

(2) The industry investment ledger, which reflects the cost associated with decreasing GHG intensity to keep pace with the declining allowance allocation rate — a shadow cost of decarbonization that is much less obvious and often underappreciated.

As a result, it is tempting to view the industry's carbon cost exposure through the narrow lens of net compliance costs and ignore the very real costs associated with investments required to decrease GHG intensity over time. Both costs are borne exclusively by California producers. Neither is borne by importers.

Unfortunately, the Proposed Amendments double-down on that approach and continue the downward march of the allowance allocation rate (via a declining CAF). The decline includes a precipitous drop in 2032 that would push the allowance allocation rate below the process emissions intensity associated with a traditional cement product mix. Put differently, even if a plant that produces a traditional cement product mix could wave a magic wand and eliminate all of its combustion emissions at zero cost, it would still be in a net negative financial position under the C&I program. Meanwhile, imported cement would face no compliance obligation.

The Proposed Amendments provide an important opportunity to evolve the C&I program in a manner that more clearly reflects relative leakage risk across industries. Unfortunately, the Proposed Amendments do not capitalize on that opportunity. For instance, under the Proposed Amendments:

- The cement industry's allowance allocation rate will continue to decline, despite the fact that imports are not held to similar standards.
- Assistance factors ("AFs") will remain at 100% for all industries, despite the fact that these factors are intended to reflect differences in leakage risk.
- The MDI program provides substantially less support to hard-to-decarbonize industries, such as cement, and excludes the decarbonization pathways most applicable to cement.

In short, the Proposed Amendments do not address the challenges the cement industry faces in achieving deep decarbonization or the further direction provided in SB 596.

With those considerations in mind, CSCME respectfully urges CARB to reassess the Proposed Amendments through the lens of the California cement industry and make substantive changes that reflect the industry's unique challenges and circumstances to reflect our shared commitment to achieving net carbon neutrality for the California cement industry by 2045.

## Cement: A Brief Primer

Cement is a dry powder that is mixed with coarse aggregates, fine aggregates, and water to produce concrete — the second most widely used materials in the world next to water.

Cement is a strategic commodity. It is essential to the construction of homes, office buildings, transportation infrastructure, water systems, and other core elements of California's built environment, and it is uniquely suited for providing maximum protection against fires, floods, and other growing threats from climate change.

As a result, a strong and vibrant local cement industry is crucial to maintaining California's economic security and advancing its policy goals. The loss of local cement capacity would increase California's reliance on imports and heighten its exposure to supply chain disruptions and price volatility in a globally traded commodity. It would also reduce California's practical ability to ensure that the cement consumed in California is produced in a manner consistent with the state's labor, environmental, and transparency standards.

Cement is manufactured by heating limestone and clay in a rotating kiln at approximately 1,500 degrees Celsius to produce clinker, which is the calcium-silicate compound that gives cement its binding properties. The manufacturing of clinker results in two types of direct GHG emissions: (1) combustion emissions associated with heating the kiln and (2) process emissions associated with the chemical transformation of the limestone. Roughly two-thirds (62%) of the California cement industry's GHG emissions footprint is associated with process emissions and roughly one-third (38%) is associated with fuel combustion.

Clinker is inter-ground with various materials to produce different kinds of finished cement:

- Ordinary Portland Cement ("OPC"), which consists of approximately 90% clinker, 5% gypsum, and 5% limestone.
- Portland Limestone Cement ("PLC"), which consists of 80% clinker, 5% gypsum, and 15% limestone.
- Other blended cements, which include supplementary cementitious materials ("SCMs") such as fly ash, slag, natural pozzolans, and calcined clay.
- Performance-based cements that need only demonstrate that they perform equivalently to the prescriptive cements above.

A common thread across these cement types is that clinker is the primary binding ingredient. The key variable is the clinker ratio — that is, the proportion of clinker relative to the total weight of the finished cement. OPC has the highest clinker ratio (approximately 90–95%), while blended and performance-based cements progressively reduce the clinker ratio by substituting SCMs, limestone, or other materials. Because the production of clinker is responsible for the vast majority of the cement industry's GHG emissions, reducing clinker ratios is one of the most readily available levers for lowering the GHG intensity of cement.

## Section 2. The State of the California Cement Industry

The California cement industry's experience over the past two decades cannot be understood through a single lens. It is a story of legislative ambition and regulatory implementation; of market booms, busts, and slow recoveries; of cooperative engagement with the state's climate framework and growing tension between that framework's demands and the industry's economic realities.

Understanding this history is essential context for evaluating the Proposed Amendments. The decisions CARB makes in this rulemaking about cap adjustment factors, allowance allocation, the MDI, and import reporting will land on an industry that has already undergone significant structural change. This section elaborates on that history and sets the scene for why getting the Proposed Amendments right is essential to the survival of the cement industry in California.

### 2.1 The Policy Arc: From AB 32 to AB 1207

The California cement industry's regulatory journey under AB 32 can be understood as a series of phases, each defined by a major legislative or policy development and each accompanied by evolving economic and competitive conditions.

#### *2.1.1 AB 32 & the Foundation of Climate Policy (2006-2012)*

The passage of AB 32 in 2006 established California as the first state to impose economy-wide limits on GHG emissions. The California cement industry supported the state's climate goals from the outset and engaged constructively with CARB during the initial design of the C&I program, including the development of the allowance allocation framework that would govern how emissions-intensive, trade-exposed industries would be treated under the program.

CARB adopted the C&I regulation in October 2011, with the first compliance obligations taking effect in 2013. From the start, the program recognized that certain industries faced acute leakage risk. Cement manufacturing was classified in the highest leakage risk category, reflecting its combination of extreme emissions intensity, high trade exposure, and thin operating margins.[13]

#### *2.1.2 The Great Recession & Its Aftermath (2007-2014)*

The adoption of AB 32 coincided with the most severe economic downturn in decades. The Great Recession devastated the construction sector, and cement consumption in California fell by approximately 60%. [14] The contraction was swift, the recovery painfully slow, and the consequences were permanent. As described in Section 2.2, several plants that shut down during the downturn never restarted.

The deep recession and slow recovery temporarily masked the competitive effects of California's asymmetric climate policies. As demand collapsed, import competition waned, and there was

simply less market to compete for. But this reprieve was illusory. The underlying competitive dynamics remained in place and would reassert themselves as the market recovered.

### *2.1.3 Cap-and-Trade Implementation & AB 398 (2013-2017)*

The cement industry entered the program's first compliance period as one of a handful of sectors classified as high leakage risk. During this period, the industry began building the compliance track record that has characterized its engagement with the program to date: California cement producers have achieved full compliance in every compliance event since inception.

The passage of AB 398 in 2017 extended the program through 2030. AB 398 reaffirmed the program's core design elements, including free allowance allocation and assistance factors at 100 percent for high leakage risk industries. For the cement industry, AB 398 provided a critical signal of policy durability — the assurance that the regulatory framework under which individual companies had been planning long-term investment decisions would remain in place through the end of the decade.

### *2.1.4 SB 596 & Carbon Neutrality (2021)*

The passage of SB 596 marked a turning point. Developed collaboratively among the cement industry, Senator Josh Becker's office, environmental advocates, and other stakeholders, SB 596 codified a path to industry decarbonization and directed CARB to develop a comprehensive strategy to achieve net-zero emissions from cement consumed in California by 2045.[15]

SB 596 reflected four critical recognitions. First, the cement industry's path to carbon neutrality would require sector-specific strategies accounting for the unique challenges of process emissions, CCUS deployment, and import competition.

> *"[Achieving carbon neutrality] will require advance planning, coordination, outreach, and development of a robust set of policies tailored to the needs and opportunities of every major emitting sector, including cement and concrete."*[16]

Second, such a strategy must include provisions to minimize and mitigate potential leakage and account for embedded emissions in imported cement — including through a border carbon adjustment.

> *"[In developing the comprehensive strategy, the state board shall] include provisions to minimize and mitigate potential leakage and account for embedded emissions of greenhouse gases in imported cement in a similar manner to emission of greenhouse gases for cement produced in the state, such as through a border carbon adjustment mechanism."*[17]

Third, there are significant market and regulatory barriers to reducing GHG emissions in the cement industry that must be removed to achieve carbon neutrality.

*"A wide range of commercially available technologies and practices exist to reduce and remove emissions of greenhouse gases throughout the life cycle of cement and concrete production and use, but these technologies and practices face a series of market and regulatory barriers hindering their deployment."*[18]

Fourth, financial support is needed to remove many of these barriers.

*"[In developing the comprehensive strategy, the state board shall] prioritize actions that leverage state and federal incentives, where applicable, to reduce costs of implementing greenhouse gas emissions reduction technologies and processes and to increase economic value for the state."*[19]

*"[In developing the comprehensive strategy, the state board shall] evaluate measures to support market demand and financial incentives to encourage the production and use of cement with low greenhouse gas intensity, including, but not limited to…measures to provide financial support and incentives for research, development, and demonstration of technologies…measures to facilitate fuel switching…[and] measures to create incentives and remove obstacles for energy efficiency improvements and waste heat recovery."*[20]

For the cement industry, SB 596 represented both a commitment and a promise. The industry committed to the goal of carbon neutrality by 2045. In return, the legislation recognized that achieving that goal would require a supportive policy framework that removed barriers, provided incentives, and ensured that domestic producers were not placed at a competitive disadvantage to imports not held to equivalent environmental standards.

### *2.1.5 AB 1207 & Extension to 2045 (2024)*

The passage of AB 1207 extended the program to 2045, aligning its time horizon with the state's carbon neutrality target. AB 1207 reaffirmed the Legislature's commitment to minimizing the risk of emissions leakage and required CARB to report to the Legislature on leakage risk, ensuring that the program's evolution would be informed by ongoing assessment of the competitive dynamics facing emissions-intensive, trade-exposed industries.

AB 1207 is significant for the cement industry for an additional reason: it established the long-term regulatory time horizon against which the industry's most consequential investment decisions will be made. CCUS deployment, which is essential to addressing process emissions, requires at least a decade or more from initial planning to commercial operation. Investments of that duration and magnitude require confidence that the underlying policy framework will be durable, predictable, and supportive. AB 1207 provided the legislative foundation for that confidence, but the Proposed Amendments will determine whether the implementing regulations deliver on it.

## 2.2 Domestic Capacity & Plant Closures

Against this policy backdrop, the California cement industry's physical footprint has contracted significantly. In 2006, eleven cement plants were operating in California. Today, just seven remain. No California cement plant that has closed in the past two decades has reopened. Each closure represents a permanent reduction of in-state production capacity — capacity that cannot be easily or quickly replaced.

These closures occurred during a period marked by significant structural and cyclical pressures. No single factor can be isolated as the sole cause of any individual closure. The record instead reflects a convergence of pressures — declining demand, aging infrastructure, rising energy and environmental compliance costs, and growing competition from imports. However, the pattern across facilities is consistent and economically instructive.

In multiple instances, a downturn or operational disruption led to a plant being idled. Once idled, the restart decision required evaluating the capital expenditures necessary to modernize or maintain compliance, ongoing energy and environmental costs, market demand projections, and competitive conditions relative to imported cement. When those cumulative costs exceeded expected returns, temporary idling became permanent closure.

These closures are illustrative of a "restart-threshold dynamic" that leakage protections are designed to address. In an import-exposed sector operating on relatively thin margins, incremental cost burdens can alter investment and restart decisions in ways that permanently reduce in-state capacity. Each additional dollar of uncovered compliance cost raises the threshold for restart and increases the probability that the next idling is the last.

This dynamic is not merely historical. According to a recent survey of CSCME members, C&I compliance costs are currently causing California cement producers to defer or cancel planned capital investments at California facilities, shift investment to facilities in other jurisdictions, and re-evaluate the long-term future of their California operations.[21] The restart-threshold dynamic that drove four plant closures over the past two decades is not a relic of the past — it is actively shaping investment decisions right now, at precisely the moment when state climate policy is asking the industry to undertake the largest capital transformation in its history.

## 2.3 Cement Production, Emissions Trends, & Import Competition

Despite the contraction in its manufacturing footprint, the California cement industry's remaining facilities have made meaningful progress in reducing their GHG emissions impact.

### *2.3.1 Cement Production*

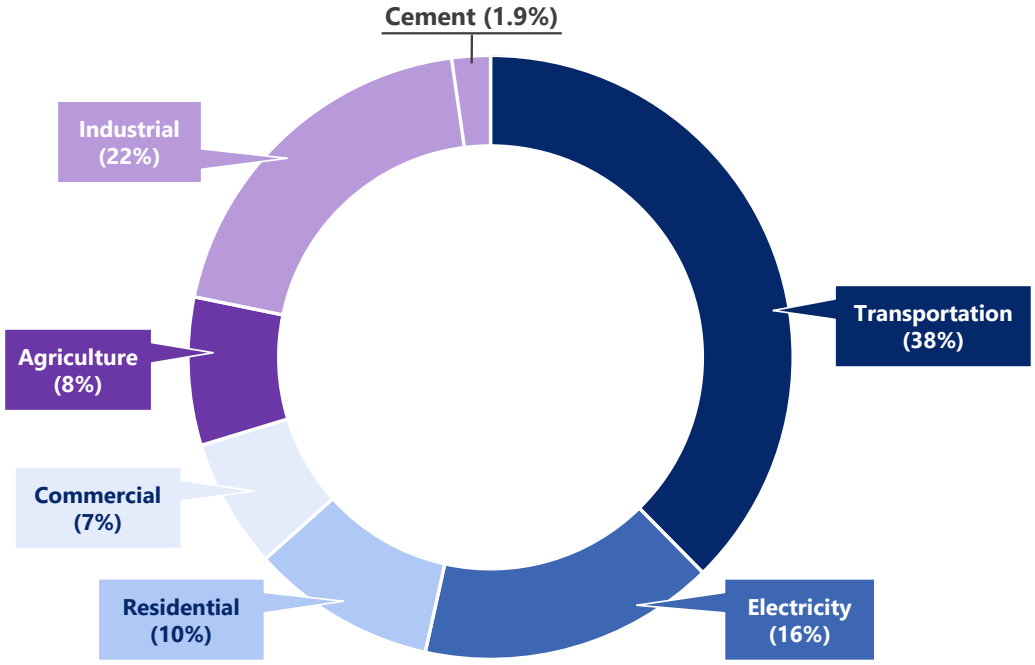
California cement production peaked at nearly 11.9 million metric tons ("MT") in 2004, fell to approximately 6.9 million MT during the recession trough in 2010, and recovered to approximately 10.4 million MT by 2018.[22] Production has since declined again, falling to

approximately 8.8 million MT in 2024 — still well below the industry's pre-recession output despite a population that has grown by millions and corresponding growth in infrastructure and other demand.[23] This trajectory reflects both the permanent loss of capacity through plant closures and the competitive pressures described in Section 2.4.

### *2.3.2 Total GHG Emissions*

The California cement industry accounts for a small fraction of GHG emissions on a state, national, and global basis. For instance, the industry accounts for roughly 1.9% of California GHG emissions, 0.1% of U.S. GHG emissions, and 0.012% of global GHG emissions.

**Figure 5. California Cement Industry, Share of Total State GHG Emissions**
Percent of GHG Emission by Sector, 2023

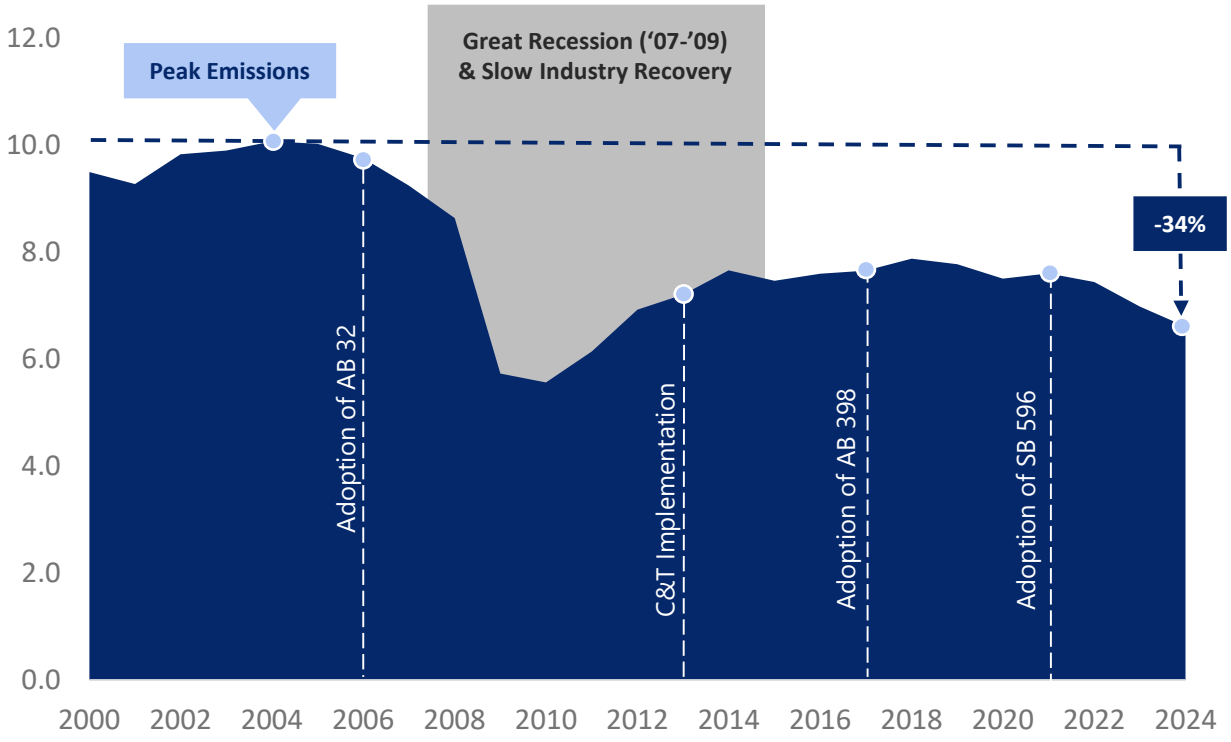



*Source: CARB (2025). GHG Inventory (2025 Edition; 2000-2023).*

California's cement plants operate under some of the world's most stringent emissions standards, air quality regulations, and environmental requirements. This combination of a relatively modest emissions footprint and high environmental performance is the direct result of decades of regulatory compliance and industry investment.

The cement industry's total covered GHG emissions peaked at approximately 10.1 million MT $CO_2e$ in 2004 (i.e., two years before the passage of AB 32). Since that time, the industry's GHG footprint has shrunk by more than one-third.[24] This decline reflects both a contraction in the industry's production base and GHG efficiency improvements at the plants that remain.

**Figure 6. California Cement Industry: Absolute Emissions**
Million Metric Tons of $CO_2e$ (Covered Emissions), 2000-2024




*Sources: CARB (2025). GHG Inventory (2025 Edition; 2000–2023) & MRR Facility Emissions Report, 2024.*

### *2.3.3 GHG Emissions Intensity*

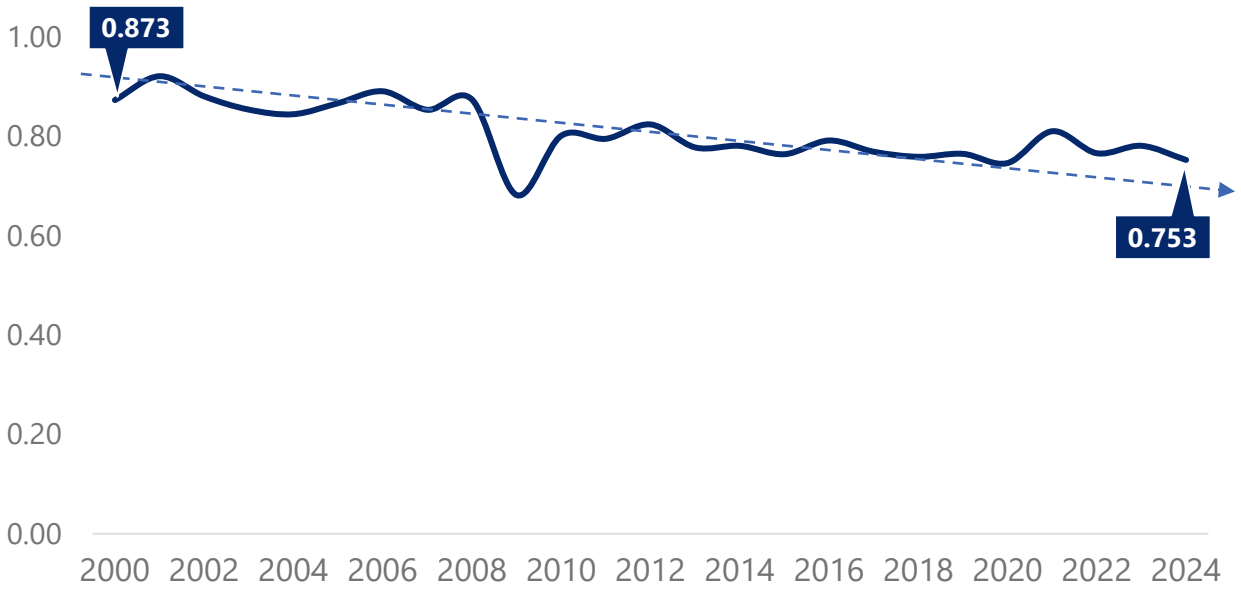
The California cement industry's GHG intensity (i.e., total covered emissions per metric ton of cement produced) has declined from approximately 0.873 MT $CO_2e$ per metric ton in 2000 to approximately 0.753 MT $CO_2e$ per metric ton in 2024, a reduction of approximately 14%.[25,26] Combustion emissions intensity has declined by approximately 36% over the same period, reflecting investments in energy efficiency, clinker intensity reductions, and expanded substitution of alternative and biomass-derived fuels.[27] As noted by CARB in the Draft SB 596 Cement Strategy:

> *"California cement plants are consistently more efficient compared to the national average, and the efficiency of California's cement plants has generally been improving over the past decade."*[28]

It is important to place these reductions in context. As described in Section 1, roughly two-thirds of the cement industry's emissions are process emissions that cannot be eliminated through fuel switching or efficiency improvements. The reductions described above therefore represent substantial progress on the portion of the emissions profile that is amenable to conventional abatement.

Further progress will increasingly depend on transformational technologies (e.g., CCUS) that can address the process emissions that conventional measures cannot. The California cement industry has, in practical terms, largely harvested the low-hanging fruit.

**Figure 7. California Cement Industry: GHG Intensity**
$MTCO_2e$ (Covered Emissions) per MT Cement, 2000-2024




*Sources: CARB (2025). GHG Inventory (2025 Edition; 2000–2023); CARB (2025). MRR Facility Emissions Report, 2024; United States Geological Survey (2025). Minerals Yearbook, Cement, Table 3; United States Geological Survey (2025). Minerals Yearbook, Cement, Table 1a (Nov 2025 release).*

### *2.3.4* Import & Competitiveness Trends

While the California cement industry has been contracting and investing in emissions reductions, the competitive landscape has shifted materially against it.

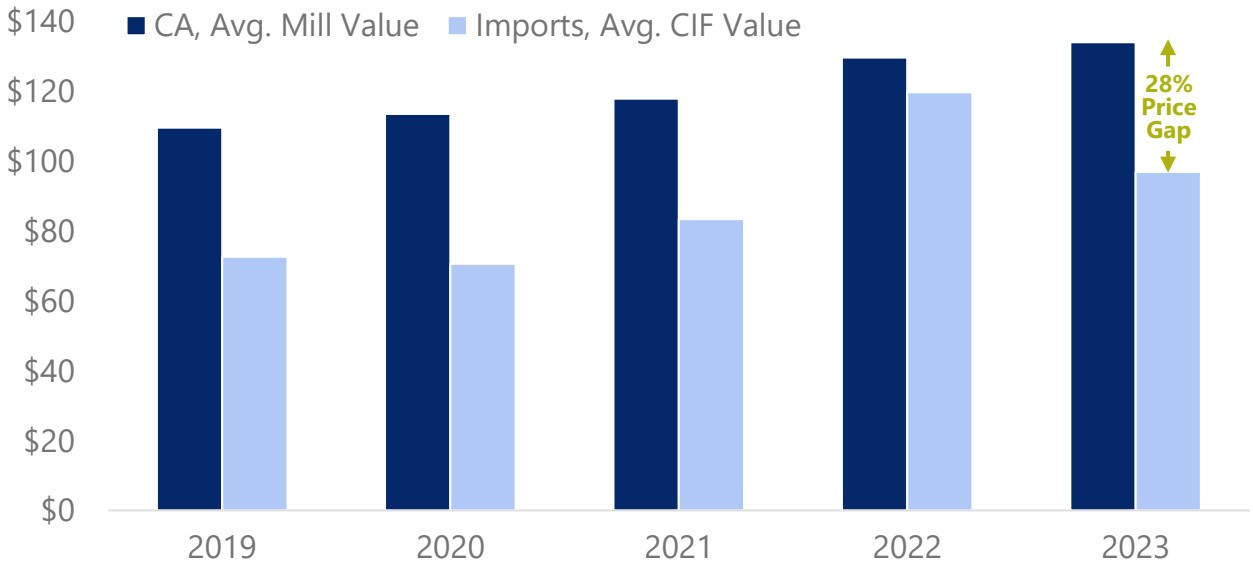
The import story in California cement is defined by two distinct surges. During the housing boom of the mid-2000s, imports surged to more than 6.9 million MT in 2007, representing more than half of all cement consumed in California.[29,30] That first surge was demand-driven: domestic capacity simply could not keep pace with construction activity, and imports filled the gap. When the recession hit, imports collapsed alongside demand — falling to just 62,000 MT in 2013, or less than 1% of consumption.[31,32]

The second surge has been fundamentally different in character. Beginning around 2016, imports have grown steadily even as domestic production capacity remained available. By 2022, imports reached approximately 2.7 million MT, accounting for more than 25% of California consumption.

In 2023, import market share rose to approximately 29% — the highest level since the demand-driven peak of the pre-recession era.[33,34] Unlike the first surge, this growth cannot be easily

explained just by a capacity shortfall. Domestic capacity exists; importers are simply offering a lower-cost alternative aided by, among other things, the carbon loophole that exempts them from the compliance costs imposed on California producers.

**Figure 8. California Cement Industry, Domestic vs. Import Price Difference**
Average $ per MT Cement, 2019-2023




*Sources: United States Geological Survey (2025). Minerals Yearbook, Cement, Table 11 (2020–2023 release); International Trade Commission (2025). Dataweb, Imports for Consumption (Customs, insurance & freight value; 1st Unit of Quantity) to CA customs districts (San Francisco, Los Angeles, San Diego), 2019–2023.*

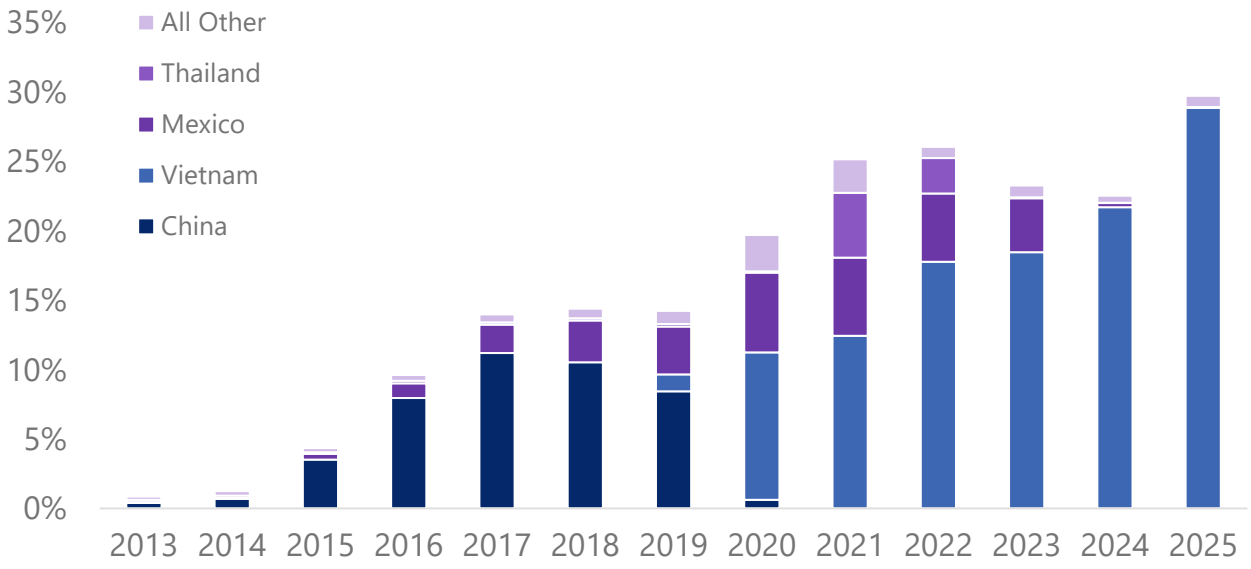
As illustrated in Figure 8, there is also a structural gap in pricing between cement that is produced in California and cement that is imported from foreign sources. This gap reflects a wide range of factors, such as differences in input costs, production costs, labor standards, transportation logistics, exchange rates, and pricing strategies. However, an important component of the gap is differences in environmental costs and, in particular, the cost of complying with the C&I program. Those costs include the cost of compliance instruments net of allowance allocations and the costs of reducing GHG emissions through investments in decarbonization projects. Imported cement, by contrast, is not subject to these same cost pressures.

While it is difficult to untangle and attribute the extent to which the gap is driven by differences in environmental standards, the implications are clear: California cement producers are already at a structural competitive disadvantage to imported cement, and that disadvantage is likely to grow as long as annual allowance allocation rates continue to decline and imports are not held to similar standards.

The geographic composition of imports has also shifted dramatically over time. In the early years of the C&I program, China was the dominant source of imported cement. By 2022, Chinese imports had effectively ceased, reflecting the combined effects of U.S. tariff policy and shifting

trade patterns. In their place, Vietnam has emerged as the dominant source of imported cement into California, growing from zero imports in 2018 to more than 2.0 million MT in 2025 and accounting for almost all California cement imports that year.

**Figure 9. Market Share of Foreign Imports in California by Source**
Foreign Imports as a Share of Apparent Consumption by Source, 2013-2025*




*Sources: International Trade Commission (2025). Dataweb, Imports for Consumption (1st Unit of Quantity) to CA customs districts (San Francisco, Los Angeles, San Diego), Jan 2013-Dec 2025; USGS (2025). Cement Minerals Yearbook, Table 9; USGS (2025). Cement Minerals Industry Survey, Table 2a & Table 2b (Nov 2025 release).*

**2025 market share of foreign imports as a share of apparent consumption calculated using annualized YTD apparent consumption (Jan–Nov) and full year 2025 import quantity.*

This geographic shift underscores a critical point: the source of imports responds dynamically to market conditions and trade policy, but the incentive to import will remain as long as California producers bear compliance costs that importers do not. Tariffs on one country may temporarily reduce imports from that source, but the underlying cost asymmetry created by the carbon loophole will attract imports from other suppliers. The cement industry's experience over the past decade (i.e., Chinese imports were replaced almost immediately by Vietnamese imports) is a textbook example of this dynamic.

The competitive implications are straightforward. Under the current C&I program, in-state cement producers face compliance costs that imported cement does not. This carbon loophole provides imports with a structural competitive advantage. Imported cement does not surrender allowances for its embedded emissions, does not face declining CAFs, and does not bear the costs of California's environmental, labor, and energy standards.

This asymmetry has three practical consequences. First, California producers cannot fully pass through the costs of GHG compliance to customers without losing market share to lower-cost

imports. Second, the asymmetry incentivizes the consumption of imported cement, which is often produced in jurisdictions with less stringent environmental regulations and generates additional transportation emissions when shipped to California. Third, the growing compliance cost gap undermines the business case for long-term decarbonization investments, because producers cannot be confident that expensive capital commitments will not be undercut by imports that bear no comparable obligation.

As described in Section 1, the combination of product fungibility, price sensitivity, and geographic accessibility means that the import threat is not theoretical. It is documented in federal trade data, reflected in the industry's declining domestic market share, and underscored by the permanent closure of four California cement plants over the past two decades.

## 2.4 Policy Trends: Federal Funding, Tariffs, & Buy Clean

The environment in which the California cement industry operates is shaped not only by the C&I program but also by a broader set of federal and state policy developments that affect the industry's competitive position and investment outlook.

### *2.4.1 Federal Investment & Its Swift Reversal*

For a period, there was reason for cautious optimism that federal investment programs would help bridge the gap between commercial reality and California's climate aspirations. The Inflation Reduction Act and the Bipartisan Infrastructure Law created funding opportunities for industrial decarbonization, carbon capture deployment, and clean manufacturing. The enhanced 45Q tax credit for carbon capture and storage, in particular, offered a meaningful complement to California's carbon price signal.

That landscape has shifted. The recent pullback of federal funding opportunities for industrial decarbonization has left the California cement industry in a more vulnerable position than even just 18 months ago. Federal grants that had been anticipated as part of project financing plans have been withdrawn or paused. The 45Q tax credit, while still on the books, faces implementation uncertainty and a fixed expiration date. DOE programs that were expected to support first-of-a-kind industrial CCUS projects have been scaled back or eliminated.

The California cement industry was an active participant in these federal programs. California cement producers applied for federal grant funding totaling between $1 billion and $2 billion across a wide range of projects, including pre-front-end engineering and design studies, pilot projects, full-scale CCUS installations, and other GHG reduction measures.[35] The withdrawal or termination of these programs has not merely reduced a theoretical funding source — it has disrupted advanced-stage project pipelines that were designed to deliver the very decarbonization outcomes that California's climate framework demands.

This development has a direct bearing on the Proposed Amendments. The MDI was not designed as a full-scale replacement for federal decarbonization investments. But with federal support

receding, the MDI and the broader C&I program take on greater significance as the primary policy tools available to incentivize and support industrial decarbonization in California. The adequacy of those tools, particularly for the cement industry, matters more now than it did when federal funding opportunities were available.

### *2.4.2 Trade Policy & Tariffs*

Federal trade policy adds another layer of complexity. Tariffs on imported cement, or on the materials and equipment needed for plant operations and capital projects, can affect the competitive dynamics in both directions. Tariffs that raise the cost of imported cement may temporarily alleviate competitive pressure on domestic producers, while tariffs on inputs to cement production may increase costs for domestic facilities. The net effect is uncertain and subject to change, which underscores the importance of durable, structural policy solutions, such as an incremental BCA, rather than reliance on trade policy instruments that are inherently unstable and not designed to address carbon leakage.

As the import data demonstrate, the shift from Chinese to Vietnamese imports following the imposition of tariffs on Chinese goods is precisely the kind of geographic arbitrage that trade policy cannot address comprehensively. An incremental BCA, by contrast, applies uniformly to all imports regardless of origin and is specifically designed to equalize the carbon compliance burden for all cement consumed in California.

### *2.4.3 Buy Clean California*

California's Buy Clean California Act requires state agencies to consider the embodied carbon of certain construction materials, including cement, in procurement decisions. CSCME supports the general principle underlying Buy Clean: that government purchasing power can be used to create market demand for lower-carbon materials. To the extent that Buy Clean measures are thoughtfully designed and increase market access for cement produced under California's stringent environmental standards, it can operate as a partial complement to the C&I program.

However, Buy Clean is not a substitute for the structural reforms needed in the C&I program. It applies only to state-funded projects, which represent a fraction of total California cement consumption. It does not impose any compliance obligation on imported cement sold in the private market. And it does not address the fundamental asymmetry that allows imported cement to avoid the compliance costs borne by domestic producers. Buy Clean can support the competitiveness of California cement in a narrow segment of the market, but it cannot close the carbon loophole that affects the market as a whole.

## 2.5 The Industry's Current Position Under the C&I Program

Two decades after the adoption of AB 32, the California cement industry arrives at this rulemaking having complied with the state's climate framework, invested in emissions reductions, committed

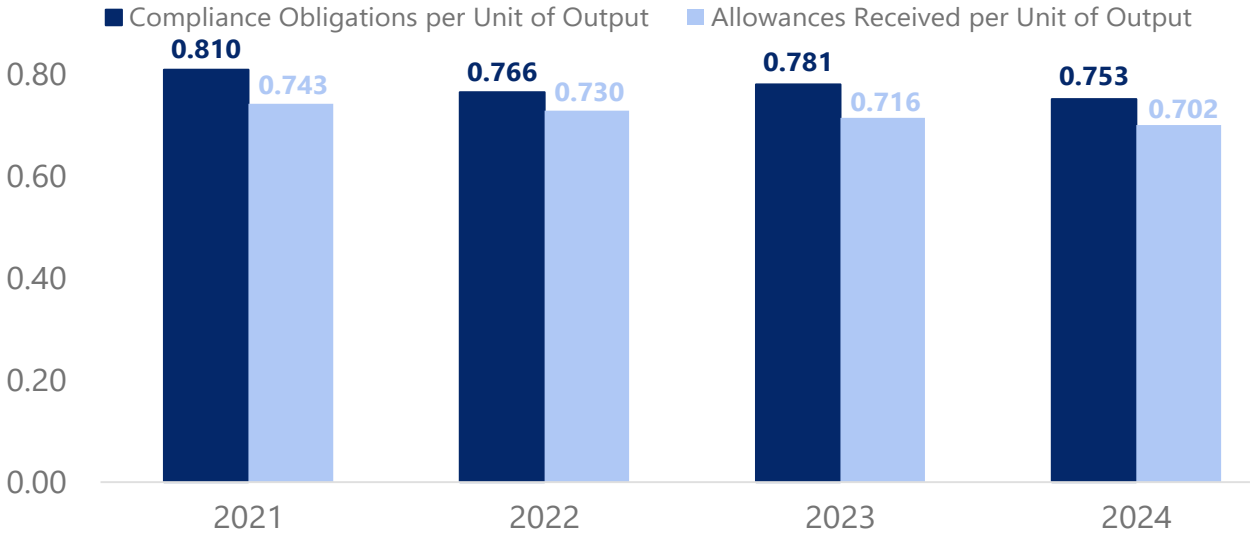
to carbon neutrality, and cooperated constructively with regulators at every stage. It has also arrived with a manufacturing footprint that is more than one-third smaller than it was at the start.

The Proposed Amendments land on an industry at an inflection point. For most of the program's first several phases, the cement industry's annual allowance allocation rate closely tracked its actual emissions intensity — meaning that: (1) the cement industry's investments in GHG reductions have largely tracked with policy expectations to date and (2) the free allocation framework has provided a meaningful buffer against the remaining GHG emissions that could not be cost-effectively reduced. But that is no longer the case.

As illustrated in Figure 10, the gap between the industry's allowance allocations and compliance obligations is negative and is only likely to widen under the Proposed Amendments.[36] At the same time, allowance prices have nearly tripled from approximately $13 per metric ton in 2013 to more than $36 per metric ton in 2024.[37] The combination of a widening allocation gap and rising allowance prices means that the California cement industry's net compliance costs will continue to rapidly escalating. At the same time, much of the low-hanging fruit has been harvested and cost-effective abatement options are severely limited.

**Figure 10. California Cement Industry: GHG Intensity & Allowance Allocation Rate**

MT of $CO_2e$ (Covered Emissions) per MT Cement | Allowances per MT Cement, 2021-2024




*Sources: GHG intensity calculated by dividing reported covered GHG emissions (CARB (2025), California's AB 32 GHG Emissions Inventory by Scoping Plan Category, 2025 Edition & MRR Facility Emissions Report, 2024) by reported cement output (United States Geological Survey (2008–2023), Minerals Yearbook, Cement, Table 3: Portland & Blended Cement Production, Capacity, & Stocks in the United States, by District). Annual allowance allocation rate calculated using product benchmark, AF, and CAF in the current version of the C&I regulation (CARB (2018). Regulation for the California Cap on Greenhouse Gas Emissions and Market-Based Compliance Mechanisms).*

That said, it is important to note that a simple accounting of compliance obligations and allowance allocations does not tell the full story of the carbon costs and competitiveness effects associated with the C&I program. As illustrated by the decline in the industry's GHG intensity in

Figure 7, the gap between compliance obligations and allowance allocations can be narrowed. But those reductions are not free — they are the result of real investment costs that: (a) do not show up on a simple ledger that compares compliance obligations to allowance allocations and (b) do not apply to cement imports, who have no incentive to make such investments.

The trajectory ahead will steepen. Under the Proposed Amendments, the alternate CAF applied to the cement industry will decline from 0.858 in 2024 to 0.547 by 2035, reducing the industry's per-unit allowance allocation rate from approximately 0.702 to approximately 0.447 per MT of cement — a reduction of more than one-third over the next decade and an end-point that will be difficult to achieve without substantial reductions in process emissions.[38] The compliance cost gap will continue to widen, and the competitive disadvantage relative to unregulated imports will continue to grow, unless the industry can achieve a comparable reduction in its actual emissions intensity over that same period. But those GHG reductions will not be free — they will be the result of significant investments that merely do not show up on CARB's ledger of compliance obligations and allowance allocations, such as in the figure above.

## 2.6 Summary

The industry's position after 20 years under AB 32 can be summarized as follows:

- **Production:** Since the passage of AB 32, the domestic manufacturing footprint has contracted from eleven plants to seven, with no closures reversed.
- **GHG Emissions Performance:** The industry has reduced its GHG emission by roughly one-third since they peaked in 2004. Its emissions intensity has declined by approximately 14%, including a 36% reduction in combustion emissions intensity. These reductions have been achieved through operational improvements to the portion of emissions amenable to conventional abatement. Significant additional progress will rest on breakthroughs in measures that reduce process emissions, such as CCUS.
- **Import Competition:** Since the implementation of the C&I program in 2013, imports as a share of consumption have grown from less than 1%in 2013 to roughly 25%. Importers continue to take advantage of the carbon loophole in the program.
- **Investment Outlook:** Federal decarbonization funding has receded. CCUS deployment remains essential but prohibitively costly without substantial policy support. The MDI, as currently designed, has limited applicability to the cement industry. The business case for long-term decarbonization investment depends on a competitive playing field and reliable funding mechanisms. Neither exist today.
- **Policy Environment:** The legislative record and frameworks (e.g., AB 32, AB 398, SB 596, AB 1207) reflect a sustained, bipartisan commitment to minimizing leakage risk while driving emissions reductions. The question is whether the Proposed Amendments implement that legislative intent in a manner that accounts for the industry's structural realities.

The Proposed Amendments will redefine the allocation trajectory, the incentive architecture, and the competitive environment for the California cement industry through 2035 and beyond. The sections that follow contain CSCME's assessment of the Proposed Amendments against the historical record and structural realities described above and identify modifications that CSCME believes are necessary to align the program with its statutory objectives and the industry's path to carbon neutrality. Sections 3 and 4 discuss notable absences from the Proposed Amendments and why their omission will undermine the cement industry's ability to achieve net carbon neutrality by 2045. Sections 5 through 8 assess specific elements of the Proposed Amendments and offer recommendations for how to modify those elements to support deep decarbonization while attempting to eliminate leakage in the cement industry.

## Case Study: The Lebec Net Zero Project

In April 2024, National Cement Company of California (NCC) was awarded $500 million from the U.S. Department of Energy (DOE) to develop the Lebec Net-Zero (LNZ) project at National's cement plant in Lebec. To support this first-of-a-kind project, the grant award is structured as a public-private partnership with a matching funds requirement for NCC.

By reducing both process and fuel emissions and capturing residual emissions, LNZ would become one of the first net-zero cement plants in the world and would demonstrate the path to carbon neutrality in the cement industry. LNZ has a three-pronged approach:

- Replace clinker with lower-carbon alternative raw materials (calcined clays) to produce limestone calcined clay cement (LC3). The Lebec plant currently produces PLC, which uses up to 15% limestone as a substitute for clinker. LC3 cement can deliver multiple times more clinker reduction than PLC.
- Replace fossil fuel with locally sourced biomass fuel from agricultural waste. The project aims to use 70% alternative fuels by its completion.
- Capture and sequester the plants remaining GHG emissions. $CO_2$ will be captured on-site and transported to an off-site geological sequestration site in Kern County.

Carbon capture is a significant share of the overall project budget, and the DOE funding is critical to de-risk the project and build economies of scale for the broader cement sector. Moreover, the adoption of an incremental BCA in California is a condition of the funding agreement, as the project would be undermined by the absence of a level playing field.

The award was finalized into a funding agreement between NCC and DOE in December 2024 but DOE informed NCC of an intent to terminate the funding agreement in May 2025. Although this has created uncertainty on the timing and pathway for the LNZ project, the need for an incremental BCA remains. If federal funding is not restored, the project will be unable to proceed in the absence of an incremental BCA.

The LNZ experience is highly relevant to this rulemaking process. It demonstrates that the California cement industry is committed to reaching net carbon neutrality, but CARB must create the conditions necessary to support large-scale, capital-intensive investments in deep decarbonization. Those conditions include:

(1) Implementing an incremental BCA to close the carbon loophole with imports.

(2) Ensuring that capital is not flowing out of the cement industry at precisely the moment it is needed to support deep decarbonization investments.

(3) Co-investing in deep decarbonization projects on terms that align with the realities of the cement industry.

Ultimately, predictable and supportive policies backed by durable commitments will be essential to achieving net carbon neutrality in the California cement industry.

## Section 3: Closing the Carbon Loophole & Leveling the Playing Field

California cement manufacturers are required to surrender C&I allowances for the GHG emissions associated with their products — a requirement that does not apply to cement importers. This regulatory asymmetry creates a "carbon loophole" that gives a competitive advantage to cement sourced from outside California and undermines the state's climate objectives by amplifying the risk of economic and emissions leakage and preventing long-term investments in deep decarbonization within the California cement industry.

This carbon loophole has contributed to a dramatic shift in market dynamics: over the past decade, imports have grown from negligible levels to roughly a quarter of all cement consumed in California. Each year that California fails to close this loophole is another year in which local producers absorb mounting compliance costs — driven by the combination of rising allowance prices and declining allocation rates — while competing against imports that bear zero GHG compliance costs (and that have far less regulatory cost burden associated with other stringent U.S. and California environmental, labor, and other obligations). This dynamic is increasing the risk of irreversible plant closures and undermining the state's ability to achieve its climate goals.

The urgency of this issue cannot be overstated. The cement industry's extreme GHG intensity, dominant share of process emissions, and high exposure to imports — the very factors that define its hard-to-decarbonize status — also make it uniquely vulnerable to the competitive distortions created by an uneven regulatory playing field. Without a mechanism that levels the carbon playing field between California producers and imports, the industry cannot make the high-cost, high-risk decarbonization investments needed to transform the sector without having those investments simply undermined by imported cement that does not play by the same rules.[39]

Until such a mechanism is put in place, CARB should pause CAF declines for high leakage risk and hard-to-decarbonize industries such as the cement industry.

### 3.1 Statutory & Policy Mandates

CARB has long acknowledged the importance of border adjustments as a leakage-minimization tool. In its foundational leakage analysis (Appendix K) published in 2010, CARB recognized that border adjustments are a first-choice mechanism for addressing leakage risk.[40] In December 2010, CARB adopted Resolution 10-42, which found that,

> *"The high emissions intensity of cement production relative to the value of the product produced makes the cement sector particularly well-suited as a pilot project for the development and consideration of a border adjustment approach to addressing the potential for leakage that could result from increases in cement importation."*[41]

Accordingly, the Board directed the Executive Officer to,

> *"review the technical and legal issues related to implementation of a border adjustment to impose obligations on importers of cement that are equivalent to those faced by California cement manufacturers under the cap-and-trade regulation, and to implement such a provision (either as part of the 15-day modifications, if it is feasible, or as part of another process) if it is necessary to avoid leakage in the cement sector."* [42]

The California legislative record also points in a clear direction. AB 32 requires CARB to "minimize leakage" in designing emissions reduction regulations.[43] AB 398, which extended the C&I program to 2030, required CARB to report to the Legislature on program progress and recommend necessary statutory changes to reduce emissions leakage, including the potential for a border carbon adjustment.[44] SB 596, which was supported by supermajorities in both chambers, explicitly directs CARB to develop a comprehensive strategy for the cement sector, including:

> *"provisions to minimize and mitigate potential leakage and account for embedded emissions of greenhouse gases in imported cement in a similar manner to emissions of greenhouse gases for cement produced in the state, such as through a border carbon adjustment mechanism."* [45]

The cement industry has consistently advocated for such a measure throughout more than a decade of regulatory proceedings. The policy rationale for an incremental approach has remained consistent throughout: by limiting the importer's compliance obligation to the difference between the GHG intensity of the imported product and the per-unit allocation rate received by California producers, an incremental BCA levels the competitive playing field while minimizing the impact on affordability for California customers. This design ensures that imports are held to comparable standards, preserves the incentive for both domestic producers and importers to reduce the GHG intensity of their products, and minimizes the price impacts associated with a full carbon cost adjustment for downstream users of cement.

In summary, the regulatory record, legislative record, and policy rationale all point in the same direction: California should implement an incremental border carbon adjustment for imported cement. The question is not whether such a mechanism is warranted — it is how quickly CARB can bring it to fruition.

## 3.2 Why The Proposed Amendments Fall Short

CSCME appreciates that CARB's Proposed Amendments include new MRR reporting requirements for cement importers. We view the establishment of import reporting as a constructive and necessary first step toward implementing a full BCA, and we view these requirements as a foundational element in evaluating a potential BCA. We discuss the specifics of these reporting requirements, as well as proposed targeted enhancements, in Section 8 and our companion letter on Proposed Amendments to the Mandatory Reporting Requirement.

However, reporting alone does not close the carbon loophole. Import reporting without an accompanying compliance obligation does not level the playing field, does not create a meaningful incentive for importers to reduce the GHG intensity of their products, and does not address the urgent and growing leakage risk facing the California cement industry.

The Proposed Amendments, taken as a whole, widen rather than narrow the competitive gap between California producers and imports. Under the Proposed Amendments, California cement manufacturers will face declining cap adjustment factors that reduce their allowance allocations over time, while imports will continue to bear zero GHG compliance costs. The cumulative impact of this trajectory — declining allocations, rising carbon costs, zero obligations on imports — is precisely the dynamic that years of regulatory and legislative language was designed to address.

We understand that designing a comprehensive BCA involves significant technical and methodological complexity. But the risks of further delay now far outweigh any remaining benefits of continued evaluation. As CSCME has demonstrated in prior submissions, CARB can implement a practical and defensible interim incremental BCA framework that covers the vast majority of cement imports and captures the vast majority of associated GHG emissions — even where facility-specific data is incomplete — by using a combination of default emissions factors and product-level data reporting.

## 3.3 The Need & Rational for an Incremental BCA

From the cement industry's perspective, the most tailored and least disruptive way to level the carbon playing field between California producers and imports while minimizing the impact on affordability is to adopt an incremental BCA. Under an incremental BCA:

- California producers would continue to receive allowance allocations at a per unit rate each year, which would continue to decline each year according to the cement industry's CAF.
- Cement importers would incur costs for the GHG emissions associated with their products consumed in California, but only on the portion that exceeds the per-unit allocation rate applied to California producers.

This design ensures that imports are held to comparable standards, preserves the incentive for domestic producers to reduce the GHG intensity of their products, and minimizes the price impacts associated with a full carbon cost adjustment for downstream users of cement.

An incremental BCA would add a modest carbon cost to imported cement equal to the net cost that the product would incur if it were produced in California. This approach provides a wide range of important benefits, including:

- Continuing to provide California cement manufacturers with a clear, consistent incentive to reduce their GHG intensity.

- Ensuring that imported cement is held to similar standards and reducing the risk that deep decarbonization investments will be undermined by unregulated imports.
- Allowing domestic producers to recover a portion of the costs associated with deep decarbonization investments via the market while minimizing the negative impact on affordability due to its incremental nature.
- Effectively closing California's carbon accounting loophole by ensuring the state holds itself responsible for the GHG emissions associated with its cement consumption — not just those that are produced within its borders.

### *3.3.1 Practicality of a BCA for Cement*

Cement is the ideal product to implement such a measure. It is a commodity that is rarely transported long distances over land. It is imported through a small number of known coastal ports and inland rail terminals. And it is rarely, if ever, transported in the form of a more integrated downstream product, as concrete cannot be economically transported long distances by truck, rail, or sea. These characteristics make cement imports straightforward to identify, track, and regulate compared to many other traded goods.

### *3.3.2 California Precedent: Electricity Imports & Transportation Fuels*

Importantly, the adoption of policy mechanisms to level the playing field with imported products is neither unprecedented nor impractical. CARB has effectively been implementing such a mechanism in the electric power sector since the inception of the C&I program. Under the "first jurisdictional deliverer" framework, in-state electricity generators and importers of electricity generated outside California are responsible for holding allowances for the GHG emissions associated with electricity they deliver onto the California grid, regardless of its origin.[46] Likewise, CARB applies the C&I program to imports of various transportation fuels that are sold, supplied, or offered for sale in California under the Low Carbon Fuel Standard.[47] These regulations apply the relevant obligations to importers, and both policies have withstood repeated legal challenges — including under the dormant Commerce Clause of the U.S. Constitution.[48]

An incremental BCA for cement follows the same fundamental logic: California may regulate the GHG emissions embedded in products consumed in California, regardless of where they are produced. The legal precedent is clear. As the Ninth Circuit has recognized, states may regulate to minimize the in-state harm caused by products sold in-state, and doing so does not amount to impermissible extraterritorial regulation or discrimination against interstate commerce.[49]

### *3.3.3 International Precedent: The EU ETS*

The European Union's (“EU”) approach to minimizing leakage within its Emissions Trading System (“EU ETS”) is directly instructive. The EU has implemented a Carbon Border Adjustment

Mechanism (“CBAM”) covering cement, iron and steel, aluminum, fertilizers, electricity, and hydrogen.

Critically, the EU maintained robust free allocation levels for these industries throughout the entire period in which the CBAM was designed, legislated, and piloted — a transitional reporting phase that ran from October 2023 through December 2025. The CBAM entered its definitive phase on January 1, 2026, at which point importers became subject to compliance obligations for embedded emissions in covered goods.

Even then, the EU adopted an "Omnibus" simplification package in October 2025 that postponed the first certificate purchases to February 2027 and introduced other measures to ease the transition for importers. Only now, after putting a functioning border mechanism in place, the EU intends to begin gradually reducing free allocation for CBAM-covered sectors, starting at just 2.5% in 2026.

The sequencing is the critical lesson: the EU did not begin reducing free allocation for its cement industry and other ETS sectors covered by the CBAM until the CBAM was operational and importers were subject to compliance obligations. California is doing the opposite.

CSCME recommends that CARB follow the EU's lead by pausing the decline in CAFs for the cement industry until a credible BCA mechanism is operational, at which point the CAF would resume its decline over a period of years to converge with the trajectory contemplated under the Proposed Amendments. This approach is consistent with the EU model, is supported by CARB's own leakage risk analysis, and would avoid the structural vulnerability created by reducing allocation protections before replacement mechanisms are in place — a risk that the ISOR itself acknowledges.[50]

## 3.4 The Relationship Between the BCA & Allowance Allocation

It is important to recognize that a BCA and the allowance allocation framework are complementary mechanisms. The allowance allocation framework helps insulate California consumers from the cost impacts of the C&I program. A BCA ensures that imported cement faces comparable carbon costs, thereby reducing the competitive distortion created by asymmetric regulation. Both mechanisms are necessary for the C&I program to minimize leakage in the cement sector.

On its own, allowance allocations cannot fully address leakage risk because they do not alter the cost of imported cement relative to domestic product. As allowance allocations decline — which they will continue to do under the Proposed Amendments — the competitive gap with imports grows wider. A BCA directly addresses this gap by ensuring that imports bear a carbon cost comparable to the cost that would be incurred if the product were produced in California.

Conversely, on its own, a BCA would be insufficient to protect California consumers from the full cost impacts of the program during the extended period in which transformative decarbonization

technologies are not yet commercially available. During this transition period, the industry needs both tools working in concert to maintain competitive viability while investing in deep decarbonization.

Accordingly, CSCME urges CARB to view the incremental BCA and the allowance allocation framework as integrated components of a comprehensive leakage-minimization strategy — not as alternative approaches between which CARB must choose. Reducing one without strengthening the other will increase leakage risk and cause potential disruption for the industry at precisely the moment when minimizing leakage and stable and predictable market conditions are critical for deep decarbonization investments.

## 3.5 Summary of CSCME Recommendations

For the reasons set forth above, CSCME respectfully urges CARB to:

- Until a proven BCA is put in place, pause CAF declines for high leakage risk and hard-to-decarbonize industries such as the cement industry.
- Implement an incremental BCA framework for imported cement without further delay, consistent with the mandates of SB 596, AB 32, and AB 398.
- Adopt a two-phase approach that establishes a practical, defensible interim framework immediately, while expanding and refining the program over time as needed.
- Use conservative default emissions factors where facility-specific data is unavailable, while providing importers with an incentive to report product- and plant-specific data.
- Recognize that the BCA and the allowance allocation framework are complementary tools that must work in concert to effectively minimize leakage risk.
- Most importantly, CARB should avoid making the perfect the enemy of the good — the risks of further delays are mounting, and California has the statutory authority, the legal precedent, and the technical tools needed to act now.

## Section 4: The Need for CCUS

The Proposed Amendments are largely silent on CCUS — the single most important decarbonization pathway for the cement sector. CCUS is not among the activities eligible for MDI funding. The program does not include accounting rules that recognize captured and permanently stored $CO_2$ for purposes of reducing a facility's compliance obligation. And the Proposed Amendments do not otherwise address the regulatory, financial, or infrastructure barriers that currently prevent CCUS deployment in the California cement industry.

That silence is significant. The decisions made in this rulemaking will define the investment environment for CCUS over the next decade and beyond. A program that restructures the architecture for decarbonizing industry through 2038 without addressing the pathway that can eliminate more than half of the cement sector's emissions is, at best, incomplete.

CSCME recognizes that CARB intends to address aspects of CCUS through the SB 905 process and other parallel proceedings. But the C&I program is where the carbon price signal, compliance obligations, and decarbonization incentives reside. Deferring CCUS entirely to parallel processes creates a disconnect between the program that imposes the compliance obligation on cement manufacturers and the framework that should be enabling the most important solution.

For that reason, CSCME believes it is essential to address the role of CCUS in the context of these amendments both to identify specific gaps in the Proposed Amendments and to build the record for how the C&I program must evolve to support CCUS deployment.

### 4.1 Policy Mandates

As CSCME has noted in prior submissions, and as CARB has recognized in the Draft SB 596 Cement Strategy, carbon neutrality cannot be achieved by 2045 without the substantial and widespread deployment of CCUS technology throughout the California cement industry.[51]

AB 32 requires the minimization of leakage and as noted in the 2022 Scoping Plan:

> *"To minimize emissions leakage and address emissions from cement plants, the Scoping Plan Scenario includes CCS for cement plants."*[52]

Furthermore, the Draft SB 596 Cement Strategy states that:

> *"Because of the high level of hard-to-abate inherent process emissions, CCUS is considered an important potential decarbonization option for the cement industry."*[53]

The policy mandate is clear. Unlocking the widespread deployment of CCUS within the California cement industry is essential to closing the gap between the state's policy ambitions and the practical realities within the industry.

## 4.2 Process Emissions Create a Structural Gap That Only CCUS Can Close

Roughly two-thirds of the California cement industry's direct greenhouse gas emissions are process emissions that result from the chemical reaction that occurs when limestone is calcined to produce clinker.[54] These emissions are inherent to cement chemistry. They cannot be eliminated through electrification, efficiency improvements, or fuel switching, including the pathways currently eligible under the MDI.

Near-term and mid-term strategies such as lower-carbon fuels, energy efficiency, and expanded production of blended cements are essential and will continue to reduce emissions intensity. CSCME supports these measures and addresses the MDI's role in supporting them in Section 6 of these comments. But those measures, individually and collectively, cannot eliminate the majority of the industry's emissions profile. Only CCUS technologies are capable of addressing process emissions at the scale required to achieve net carbon neutrality in the cement sector.

A C&I program that does not incentivize CCUS in its design, its compliance accounting, or its treatment of CCUS investments is not fully aligned with the state's own climate objectives.

## 4.3 The Scale & Complexity of CCUS Deployment Cannot Be Overstated

Retrofitting an existing cement plant with CCUS is an exceptionally complicated and capital-intensive undertaking. It requires navigating a long sequence of interdependent steps, from strategic planning feasibility studies, to front-end engineering and design, to securing private and public financing, to completing overlapping federal and state environmental reviews, to obtaining construction and operational permits, to building and commissioning capture infrastructure and associated energy systems. This process involves at least a dozen critical steps, any one of which can determine whether a project succeeds or fails.

The capital requirements are staggering. According to the U.S. Department of Energy, the total as-spent cost of retrofitting an average-sized cement plant in a midwestern state with post-combustion capture technology ranges from $737 million to more than $1 billion, depending on assumptions regarding $CO_2$ concentrations, fuel type, and heat integration.[55] Given the above-average material, labor, and energy costs in California, the cost of installing CCUS at a California cement plant could easily exceed $1 billion — roughly five times the annual revenue generated by a comparably sized plant. In practical terms, CCUS is akin to building a new cement plant inside an existing one, but without any increase in output or capacity.

California cement plants will also face substantially higher operating costs as a result of CCUS deployment, including additional labor, administrative support, maintenance materials, and higher fuel, electricity, and water demand. Under a reference case scenario, the DOE estimates that a CCUS retrofit is likely to increase a plant's annual operating costs by approximately $68 million per year.[56]

Combining capital and operating costs, the DOE conservatively estimates that the cost of $CO_2$ captured will be nearly $100 per MT over the operating life of a CCUS retrofit — and that figure excludes the cost of transporting and permanently storing captured $CO_2$.[57] To put that figure into perspective, it is more than three times the prevailing price of a California C&I allowance. Widespread deployment of CCUS is simply not economically feasible without substantial government support and a policy framework that de-risks these investments.

The scale of what is required should not be underestimated. The Heidelberg Materials cement plant retrofit in Brevik, Norway, which is slated to be the first operational cement CCUS retrofit at a scale comparable to California cement plants, required approximately $2.7 billion in total investment, of which roughly $2 billion was public funding.[58] Widespread deployment of CCUS across the California cement industry would require multiple projects of that magnitude over the next two decades.

The timeline is equally challenging. From feasibility study to final investment decision, through permitting, construction, commissioning, and operation, a single project can take at least a decade or more. Because federal incentives such as 45Q tax credits operate within fixed windows and phase out after only 12 years of operation, and because California's 2045 target leaves little margin for delay, action must occur well in advance of statutory deadlines. The MDI itself runs only through 2038. If the program's decarbonization framework does not account for CCUS within that window, it will have missed the critical period for laying the groundwork.

## 4.4 Regulatory Barriers & Infrastructure Gaps Extend Timelines & Increase Risk

CCUS deployment requires navigating overlapping federal and state environmental review processes, including NEPA and CEQA where applicable. Both can take several years to complete and often cause cascading delays for subsequent approvals. Additional permitting requirements (e.g., those related to land use, waters of the state or United States, endangered species, pipeline rights-of-way, and local air district approvals) further extend timelines. Because CCUS retrofits do not expand production capacity and are undertaken solely to reduce GHG emissions, these delays are particularly consequential: they do not merely slow projects — they undermine their viability.

California cement plants have experienced permitting delays associated with decarbonization projects, with one delay extending over eight years.[59] These delays have caused producers to defer capital allocation, cancel projects outright, and in some cases reallocate capital to facilities in other jurisdictions — materially increasing project costs and, in certain instances, foreclosing projects entirely.[60] These are not edge cases. They are the predictable consequence of permitting processes that are not calibrated to the urgency of the decarbonization challenge.

The permitting challenge extends beyond the plant fence line. California currently lacks clear and streamlined processes for $CO_2$ pipeline permitting and storage development. As CSCME has detailed in its response to CARB's SB 905 Request for Information, a statewide moratorium on

$CO_2$ pipeline construction and the absence of a clearly designated lead agency or protocols for approving pipeline applications are preventing timely development of the transportation and storage infrastructure that is a necessary condition for successful CCUS deployment.[61] Cement manufacturers can capture $CO_2$ at the plant, but they cannot independently develop regional transportation and storage systems. Widespread deployment therefore depends on coordinated action across agencies and levels of government.

Litigation risk and procedural uncertainty compound these challenges. As has been well documented, interest groups have increasingly used CEQA and other permitting processes to delay or block investment in California's manufacturing sector. These sources of uncertainty substantially increase both the risk and the cost of CCUS deployment, as construction delays not only extend timelines but increase total project expenditures.

Regulatory clarity, coordination, and efficiency are essential — not to weaken environmental safeguards, but to ensure that projects designed to achieve deep emissions reductions can proceed on a realistic timeline.

## 4.5 A Level Playing Field Is a Prerequisite for CCUS Investment

CCUS deployment will materially increase the cost of producing cement in California. Cement manufacturers will need to pass both capital and operating costs through to customers to generate a reasonable return on their investment. Such cost increases will inevitably place California cement manufacturers at a structural disadvantage relative to imported cement from jurisdictions with less stringent environmental regulations, even before factoring in the increasing compliance costs associated with the declining cap adjustment factor.

In other words, CCUS deployment is virtually certain to increase leakage risk in the absence of a mechanism that holds imported cement to a comparable environmental standard. From the cement industry's perspective, an incremental BCA is a prerequisite to making large, high-risk investments in CCUS. In the absence of such a mechanism, domestic producers will be increasingly undersold by imports that bear no comparable carbon costs and will be unable to justify significant capital commitments in decarbonization.[62] Absent a level playing field, it will be impossible for the industry to make the large, long-lived capital investments that CCUS requires.

As discussed in Section 3 of these comments, establishing a mechanism that closes the existing carbon loophole for imported cement is foundational to CCUS deployment — not merely complementary to it.

## 4.6 Summary of CSCME Recommendations

CSCME recognizes that CCUS policy will develop across multiple proceedings, including under SB 905. But several elements are squarely within the scope of the C&I program and should be

addressed in this rulemaking or in near-term subsequent amendments. Specifically, CSCME recommends that CARB:

- Maintain leakage protection during the CCUS investment period. As discussed in Section 3, CSCME recommends that CARB pause further reductions in CAFs until an incremental BCA is implemented. This is particularly important in the context of CCUS, where producers will be making decade-long capital commitments. Reducing leakage protection during the very period in which the industry is expected to invest in deep decarbonization would undermine the confidence needed to move forward.
- Establish clear accounting rules for captured and stored $CO_2$. The C&I program currently does not include a protocol that recognizes captured and permanently sequestered $CO_2$ for purposes of reducing a facility's compliance obligation. Without such recognition, a cement manufacturer that successfully captures and stores emissions would receive no direct compliance benefit under the very program that imposes the obligation — weakening the economic case for investment. At a minimum, California cement producers deploying CCUS should receive a financial incentive for $CO_2$ capture and storage equal in value to the carbon price set by the C&I market. Without such rules, the program's carbon price signal, which is intended to incentivize decarbonization, will fail to perform that function for the single most important decarbonization technology available to the cement industry.
- Formally recognize that capturing and storing $CO_2$ emissions that originates from biomass fuel combustion is a net carbon negative outcome. Without this recognition, there is no economic incentive to capture $CO_2$ resulting from biomass fuel combustion, which would represent a missed opportunity as California drives toward net carbon neutrality.
- Include CCUS among the activities eligible for MDI funding. The MDI is designed to incentivize industrial decarbonization through 2038. Excluding CCUS from that framework means that the program's primary decarbonization incentive does not support the pathway that addresses the majority of cement sector emissions. At a minimum, CCUS-related capital expenditures (e.g., front-end engineering and design, environmental review costs, and capture equipment) should be eligible for MDI support. These are precisely the kinds of high-cost, long-lead-time investments the MDI was designed to unlock.
- Signal that the C&I program will evolve to support CCUS. Even if comprehensive CCUS provisions cannot be adopted in this rulemaking, CARB should use this proceeding to signal that CCUS integration is a near-term priority for the C&I program. A clear statement of intent with a timeline for developing accounting rules, incentive provisions, and coordination with the SB 905 process would provide a measure of confidence to producers and investors evaluating CCUS projects today.

## Recognizing Recarbonation as a Carbon Sink

Recarbonation is a well-documented chemical process by which hardened concrete gradually reabsorbs $CO_2$ from the atmosphere over its service life. This phenomenon is not speculative; it is intrinsic to cement chemistry and has been observed and quantified across a wide range of structures and climates.

As noted by CARB in the Draft SB 596 Strategy,

> *"At final use, cement is mixed with aggregate, admixtures, and water to create concrete. Concrete is the most common building material in the world and theoretically can be a carbon sink and a source of permanent sequestration." (pp.56)*

At a fundamental level, carbonation occurs when atmospheric $CO_2$ diffuses into concrete pores and reacts with calcium-bearing phases in the cement matrix. The reaction produces calcium carbonate ($CaCO_3$), a thermodynamically stable mineral. Because this reaction converts gaseous $CO_2$ into a solid carbonate phase, the carbon is permanently bound within the concrete matrix.

In effect, a portion of the $CO_2$ released during cement manufacturing is re-sequestered in the built environment. The rate and magnitude depend on multiple variables, including surface area exposure, concrete permeability, humidity, temperature, and time. Large surface-area applications such as pavements can enhance uptake potential.

For the California cement industry, recarbonation is not a substitute for deep process-emissions reductions, but it is a material component of a net-zero framework. The Draft SB 596 Cement Strategy explicitly recognizes the need to account for emissions and removals across the life cycle of cement used in California. Because carbonation constitutes a measurable downstream sink associated with cement use, it is directly relevant to how greenhouse gas intensity baselines and reduction trajectories are defined under SB 596.

From an industry standpoint, recarbonation reinforces two strategic points. First, cement is not merely a source of $CO_2$ — the concrete it enables functions as a distributed, long-lived carbon sink embedded in infrastructure. Second, policies that encourage beneficial reuse of end-of-life concrete — such as recycling, controlled stockpiling, or optimized exposure — can incrementally enhance carbon uptake while displacing virgin material demand. Several producers are actively exploring circular approaches that integrate demolition material recovery with lifecycle emissions reduction.

For CARB and other stakeholders, the policy question is not whether carbonation occurs, but how to account for it rigorously. The California cement industry is currently working with leading academic researchers on this issue to quantify the recarbonation effect under California-specific conditions and to develop a technically robust basis for recognizing the cement in concrete as a measurable carbon sink. This effort is intended to ground future policy discussions in empirical data so that any recognition of recarbonation within California's climate framework, including its GHG inventory and the C&I program, reflects defensible science rather than generalized assumptions.

## Section 5: Proposed Changes to the Allowance Allocation System for Cement

The allowance allocation system is the C&I program's primary mechanism for minimizing emissions leakage. It is built on a straightforward premise: by providing free allowances to emissions-intensive, trade-exposed industries in proportion to their output, the program can maintain a carbon price signal that incentivizes emissions-efficient production while mitigating the competitive distortions that would otherwise drive production and emissions to unregulated jurisdictions.

For the cement industry, the allocation system operates through a product-based methodology in which a facility's annual allocation is determined by its output of finished cement, scaled by four factors: the product benchmark, the assistance factor, the cap adjustment factor, and (beginning with the Proposed Amendments) an electricity allocation component. Each of these factors affects the level of leakage protection the program provides. Collectively, they determine whether the C&I program fulfills its statutory mandate to minimize emissions leakage in the state's most vulnerable industrial sector.

The Proposed Amendments make several changes to the allowance allocation system that affect the cement industry. Some are constructive and warrant support. Others are missed opportunities that leave the program's leakage protections weaker than they should be at a critical juncture. This section addresses each of the major allocation components in turn.

### 5.1 Output: Updated Definitions of Finished Cement, Cement, & SCMs

Under the C&I Proposed Amendments, CARB seeks to ensure equivalent treatment of SCM use regardless of where blending occurs in the supply chain. To accomplish this, the amendments propose a definition of "finished cement," which means "cement that includes adjusted clinker, mineral additives, and SCMs produced by a covered or opt-in covered entity."[63]

The proposed approach generally reflects several sound policy instincts. It explicitly recognizes the use of SCMs as a critical near-term pathway for reducing clinker-related emissions. By expanding the benchmark to include SCMs used to make finished cement, CARB creates a direct incentive for cement producers to increase their use. This is exactly the type of market-based decarbonization signal that the C&I program should be sending. As CARB acknowledges:

> *As California transitions to a decarbonized economy, it is important (1) to support increased use of low-carbon materials to make cement, and (2) to treat conventional and low-carbon cements on an equivalent basis when providing leakage protection if a low-carbon cement can be demonstrated to be functionally equivalent to conventional cement.*[64]

Although the proposed definition of "finished cement" is conceptually sound, important revisions are needed to ensure clarity and fully operationalize the definition in the context of the allowance allocation framework.

### *5.1.1 The Definition of "Finished Cement" (i.e., Output)*

CSCME supports CARB's proposals to change the definition of cement output from "Adjusted Clinker and Mineral Additives Produced" to "Finished Cement" and broaden the scope of output to include SCMs. However, as done with the prior output metric, we strongly recommend that CARB specify the components and calculation of "Finished Cement" for clarity. Specifically, we recommend that "Finished Cement" be defined as follows:

> "Finished cement" means ~~cement that includes adjusted clinker, mineral additives, and SCMs produced by a covered or opt-in covered entity~~ the annual amount of clinker, limestone, gypsum, baghouse dust, grind aids, and SCM output derived by using the following metric: Finished cement = clinker produced x (1 + (limestone, gypsum, baghouse dust, grind aids, and SCMs consumed) / clinker consumed)).[65]

In addition, given that the prior output metric of "Adjusted Clinker and Mineral Additives Produced" no longer clearly serves a functional purpose, we recommend that CARB delete that definition in its entirety to avoid confusion in the future.

### *5.1.2 The Definition of "Cement"*

The C&I and MRR Proposed Amendments define "cement" as:

> *"Cement" means a manufactured material that meets the specification standards for Portland cement (such as ASTM C150 (2022), which is incorporated by reference herein) or hydraulic blended cements (such as ASTM C595 (2023), which is incorporated by reference herein), or that meets performance-based standards for functional equivalents of Portland or hydraulic blended cements (such as ASTM C1157 (2023), which is incorporated by reference herein). Cement is used to make concrete, masonry cement, plastic (stucco) cement, and mortar cement.*[66]

CSCME proposes that CARB modify the definition of "cement" to delete the reference to the year of the ASTM standard (i.e., "ASTM C150 (2022)). ASTM requires standards to be reviewed at least once every 5 years, and many standards are revised on a more frequent basis. For example, C595 is currently undergoing a major revision that allows for greater clinker substitution than the 2023 definition. The inclusion of the year of the ASTM will result in an overly limited definition of "cement," which undermines the purpose of expanding the definition, creates uncertainty for the cement industry, and will require additional CARB administrative oversight and action to ensure that the ASTM standard referenced in the definition reflects the year of the most recent change.

Moreover, CSCME recommends using "portland cement" rather than "Portland cement" as normally used in the industry and the ASTM standards. The corresponding change should be made to the definition of "Portland cement" in the MRR Proposed Amendments.[67]

### *5.1.3 The Definition of "Supplementary Cementitious Materials"*

The C&I and MRR Proposed Amendments define SCMs as:

> *"Supplementary Cementitious Materials" or "SCMs" are materials that are added to and contribute to the properties of a cementitious mixture through hydraulic or pozzolanic activity, or both, such as fly ash, ground granulated blast furnace slag, silica fume, natural pozzolan, calcined clay, and glass pozzolan.*[68]

CSCME has no comments on the SCM definition, which recognizes the diverse range of SCMs that are currently available and may be developed in the near future.

That being said, CSCME notes that the treatment of SCM producers under the allocation framework raises separate and distinct issues that are addressed in Section 7 of these comments. CSCME's support for the definition of SCMs should not be construed as support for extending industrial allowance allocation to SCM producers themselves, which we believe is both counter to the essential purpose of industrial allowance allocation and undermines the incentive to increase the production of blended cements that the expansion of the definition of cement is intended to support.

## 5.2 Assistance Factors

The Proposed Amendments extend assistance factors ("AFs") at 100% for all emissions-intensive, trade-exposed industrial sectors through 2035. CSCME supports the continuation of 100% AFs and agrees that reducing them would be inappropriate given the current leakage risk environment.

However, CSCME believes that CARB's approach to AFs reflects a significant internal inconsistency that warrants examination — not because assistance factors should be reduced for any industry, but because CARB's failure to differentiate among industries with dramatically different leakage risk profiles has consequences for the program's effectiveness and credibility.

CARB's own leakage risk framework, as established in the original program design and reflected in Table 8-1 of the regulation, classifies industries into three tiers of leakage risk: high, medium, and low.[69] These classifications were not arbitrary. They were developed through the rigorous analytical framework described in CARB's Appendix K, which assessed leakage risk based on emissions intensity, trade exposure, and the ability to pass costs through to consumers. CARB gave greater weight to emissions intensity, reasoning that industries with higher emissions intensities are more sensitive to the effects of cost pass-through ability and therefore face amplified leakage risk.[70]

Yet despite constructing this differentiated risk framework, CARB has never used it to differentiate AFs. Every covered industrial sector, regardless of whether it faces high, medium, or low leakage risk, receives the same 100% AFs. The cement industry, with is widely recognized as hard-to-decarbonize, receives the same AFs as sectors with a fraction of its GHG intensity, a fraction of its

trade exposure, and/or no process emissions. That fact raises significant questions regarding fair and equitable treatment.

CSCME does not advocate reducing AFs for any industry. The 100% AFs are appropriate in the current environment and reducing it for lower-risk industries would be counterproductive. Rather, we raise this point to underscore a broader argument that is central to these comments: if CARB's own analytical framework recognizes that industries face materially different levels of leakage risk, the program should provide materially different levels of leakage protection. The failure to do so is not a matter of fairness and equity between industries — it is a matter of whether the program is fulfilling its statutory mandate to minimize leakage for the industries that face the greatest risk.

The AFs is only one tool in the allocation framework. If CARB is not prepared to differentiate assistance factors, it should use the tools it does control (e.g., CAFs, BCAs, and the MDI) to provide the additional protection that the most vulnerable sectors demonstrably require. A program that classifies the cement industry as high leakage risk, recognizes it as hard-to-decarbonize, confirms those classifications in every subsequent analysis, but then does not differentiate its treatment accordingly has a coherence problem. The recommendations in this section and in Section 3 (BCA), Section 4 (CCUS), and Section 6 (MDI) are designed to address that problem through complementary mechanisms.

## 5.3 Cap Adjustment Factors

The cap adjustment factor is the single most consequential variable in the cement industry's allowance allocation. It determines the rate at which the industry's free allocation declines over time, and it therefore determines the pace at which the competitive gap between domestic cement and unregulated imports widens.

Under the existing regulation, the cement industry uses the alternate CAF, which declines at half the annual rate of the standard CAF and, accordingly, recognizes that industries with both a dominant share of process emissions and a high leakage risk classification face fundamentally different decarbonization constraints than other covered sectors. The Proposed Amendments maintain the existing CAFs through 2031 and add new CAFs for 2032 through 2035. The alternate CAF will decline from 0.747 in 2031 to 0.547 in 2035.

CSCME appreciates the rationale CARB has offered for this trajectory: that the CAFs are calculated to be proportional to the proposed overall allowance budgets using the same methodology applied since 2013.[71] However, proportionality to the overall budget is not the same as adequacy for leakage minimization, especially given that only the latter is compelled by statute.

In addition, the Proposed Amendments do not adequately account for three developments that have fundamentally altered the leakage risk landscape since the current CAF trajectory was designed. First, the cement industry's emissions intensity has crossed above its allowance

allocation rate, and the gap is widening. As described in Section 2, the industry's GHG emissions intensity was approximately 0.753 MT of $CO_2e$ per MT of cement in 2024, while the allowance allocation rate was approximately 0.702 — a gap of more than 0.05 $MTCO_2e$ per MT that must be covered through allowance purchases at market prices. Under the Proposed Amendments, the allocation rate will decline to approximately 0.447 by 2035 while the industry's actual intensity, especially absent CCUS deployment at scale, will likely remain much higher. Meanwhile, imported cement bears none of this cost.

Second, no BCA is in place or scheduled for implementation. As discussed in Section 3, the EU effectively maintained the level of free allocation while a CBAM was being developed. California is doing the opposite: reducing the allocation rate for cement while imports face zero compliance costs. CARB's own ISOR acknowledges that California's ratio of industrial allocation to covered emissions (62%) is already lower than every comparable jurisdiction, including Washington (~100%), Québec (99%), the EU (84%), and the United Kingdom (72%).[72] The Proposed Amendments will further widen this gap.

Third, federal support for industrial decarbonization has receded. As described in Section 2, the pullback of federal funding for industrial CCUS and decarbonization has eliminated a critical source of anticipated investment capital. The cement industry's ability to close the emissions intensity gap through technological advancement depends on access to capital that is now less available. Reducing the allocation rate in this environment compounds the problem: it withdraws capital from the industry at precisely the moment when that capital is most needed to finance the very decarbonization investments that would eventually reduce the industry's dependence on free allocation.

For these reasons, CSCME recommends that CARB pause the decline in the alternate CAF for the cement industry until a credible BCA mechanism is operational. At that point, the CAF decline should resume on a trajectory that converges with the schedule contemplated under the Proposed Amendments over a reasonable transition period. This approach is consistent with the EU model described in Section 3, is supported by CARB's own comparative analysis in the ISOR, and reflects the sequencing logic that every other major emissions trading system has followed: do not withdraw allocation protections before replacement mechanisms are in place.

CSCME recognizes that a cement-specific CAF pause raises questions about program design precedent. We believe those questions are answerable. The alternate CAF already embodies a cement-specific accommodation — it exists because CARB recognized that hard-to-decarbonize industries with a dominant share of process emissions face different constraints. Pausing the decline until a BCA is operational is a logical extension of the same principle: the allocation framework should not be tightened faster than the industry's ability to respond, and it should not be reduced below a level that invites the very leakage it was designed to prevent.

## 5.4 Indirect Electricity Allocation

The Proposed Amendments transfer responsibility for providing industrial leakage protection for carbon costs embedded in purchased electricity from the California Public Utilities Commission's ("CPUC") Industry Assistance Program to CARB, beginning with budget year 2027. Under the new framework, each product benchmark is supplemented by an electricity benchmark (measured in MWh per unit of output), and the electricity allocation is calculated using a statewide average grid emissions factor of 0.212 MT of $CO_2$-e per MWh.

CSCME generally supports this change provided that it is implemented in a manner that maintains the overall level of allowance value delivered to an industrial facility. Consolidating all industrial allocation through CARB is a logical and overdue simplification that will ensure consistent treatment across all covered industrial facilities, regardless of whether they are served by investor-owned utilities, publicly owned utilities, or electrical cooperatives. Under the prior framework, facilities served by non-IOU utilities were not eligible for CPUC's Industry Assistance Program, creating an inequity in leakage protection that the Proposed Amendments correctly address.

CSCME continues to evaluate the impacts of the proposed approach, which is complicated by the fact that the mechanics of the CPUC's delivery mechanism are somewhat opaque. CARB could greatly aid our understanding by including a substantially expanded section in the updated Statement of Reasons document that elaborates on the mechanics of the CPUC's delivery mechanism and one or more examples that demonstrate that the proposed approach will maintain the overall level of allowance value delivered to an industrial facility.

## 5.5 Summary of CSCME Recommendations

For the reasons set forth above, CSCME respectfully urges CARB to:

- Expand the definition of output for the cement industry to include SCMs.
- Maintain assistance factors at 100% while acknowledging that the program's failure to differentiate leakage protection across risk categories must be addressed through complementary mechanisms, particularly the CAF, a BCA, and the MDI.
- Pause the decline in the alternate CAF for the cement industry until a credible BCA mechanism is operational, at which point the CAF decline should resume on a trajectory that converges with the currently proposed schedule.
- Support the transfer of indirect electricity allocation to CARB. The consolidation of all industrial allocation through a single agency is a logical simplification that ensures consistent leakage protection across all covered facilities.

More broadly, CSCME urges CARB to approach the allowance allocation system as an integrated framework in which the CAF, the BCA, the MDI, and indirect electricity allocation work together

to provide a coherent leakage minimization strategy. The current Proposed Amendments adjust individual components of this framework without adequately considering how they interact. This is particularly important for an industry like cement, where the cumulative effect of a declining CAF, an absent BCA, a limited MDI, and rising allowance prices imposes a compliance environment that is less tenable in the near term and unsustainable in the longer term to preserve the California cement industry.

## Section 6: The Manufacturing Decarbonization Incentive

The Manufacturing Decarbonization Incentive ("MDI") is an innovative concept with tremendous potential to drive transformational investments in GHG reductions across the industrial sector. In proposing the MDI, CARB is confronting the reality that decarbonizing the industrial sector while minimizing the risk of economic and emissions leakage will require broader and more robust tools than the current C&I program has to offer.

The California cement industry exemplifies the challenge of industrial deep decarbonization — both in terms of the scale and the nature of its GHG footprint. Among industries potentially eligible for the MDI under CARB's Proposed Amendments, the cement industry's GHG footprint is larger than all other eligible industries combined.

Put differently, cement is, by far, the largest potential source of demand for MDI funding. And the cement industry has a unique combination of factors that make it especially difficult to decarbonize while minimizing leakage: a GHG intensity that is multiple times greater than other industries, a high trade exposure to imports from distant nations not held to similar standards, and a dominant share of process emissions that severely constrain a plant's opportunities to meaningfully reduce its GHG footprint.

As a result, an MDI that is not designed to meet the circumstances of the cement industry is highly likely to be underutilized and unlikely to achieve the broader goal of decarbonizing California's manufacturing sector.

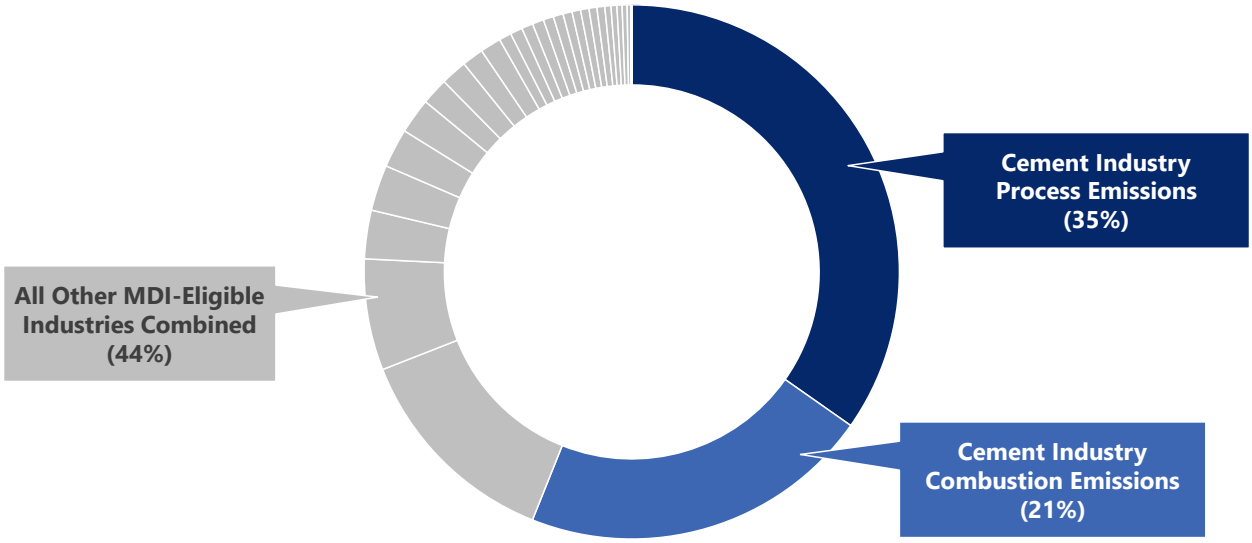
CSCME appreciates CARB's effort to develop the MDI as part of the Proposed Amendments to the C&I program. The introduction of the MDI is especially timely from the cement industry's perspective. The cumulative impact of declining allowance allocations, rising carbon costs, and increasing competition from unregulated imports has pushed the industry past a tipping point. The C&I program is now effectively withdrawing capital from the industry each year, creating a vicious cycle: diminished capital leads to diminished investment, which leads to greater carbon costs and further erosion of competitiveness relative to unregulated imports, which then leads to greater capital loss.

At one point, the industry was hopeful that federal funding opportunities would help slow, stop, and potentially reverse this cycle. The recent pullback of those opportunities has left the industry without a viable path to financing the long-lived, capital-intensive decarbonization projects that the MDI is designed to support.

Although the MDI has tremendous promise, we believe the current design is likely to fall substantially short of its potential. Our assessment is based on two observations. First, as currently designed, the MDI has limited applicability to cement manufacturing, which represents a majority (56%) of GHG emissions among potentially eligible industries. In fact, the MDI includes zero pathways for reducing cement industry process emissions, which alone account for more than one-third of all GHG emissions among potentially eligible industries.

Second, the MDI is fundamentally misaligned with the practical realities of industrial decarbonization projects. The program includes several design choices that undermine a plant's ability to underwrite a long-term investment and create a "use it or lose it" dynamic in which capital must be deployed on CARB's schedule rather than when projects are ready to proceed.

**Figure 11. Distribution of GHG Emissions Across MDI-Eligible Industries**
Share of Total GHG Emissions, 2024




*Source: CARB (2025). MRR Facility Emissions Report, 2024. CARB (2026). Proposed Amendments to the California Cap on Greenhouse Gas Emissions and Market-Based Compliance Mechanisms Regulation, Appendix A-1: Proposed Regulation Order. Includes all industries eligible for output-based rebates except those explicitly excluded in the Proposed Amendments. Assumes cement industry process GHG emissions are 62% of total GHG emissions.*

That said, we believe that with targeted modifications to certain design features, CARB can make the MDI far more accessible and usable — helping the program realize its full potential.

The remainder of this section outlines CSCME's proposed changes. It begins by demonstrating why the current MDI design has limited applicability to the cement industry. It then walks through a series of design features that, if modified, can substantially improve the program's accessibility and usability. It concludes by summarizing CSCME's recommendations.

## 6.1 Assessment of the Proposed Approach

The proposed eligible activities under the MDI include:

(1) Procurement of exempt biomass-derived fuels.

(2) Electrification projects.

(3) Procurement of low-carbon hydrogen.

(4) Renewable electricity generation or storage that reduces onsite fossil emissions.

(5) Solar thermal or geothermal energy generation.

(6) Procurement of electrified thermal energy.

While these pathways may be relevant to some industrial subsectors, most do not align closely with the technical and operational realities of cement production. Below, we briefly assess each pathway from the perspective of cement manufacturing.

### *6.1.1 Biomass-Derived Fuels*

Biomass substitution is the pathway most directly relevant to cement production. Cement kilns can incorporate biomass and certain alternative fuels as partial substitutes for fossil fuels. However, fuel cost is not the binding constraint at higher substitution rates — the constraint is the capital-intensive infrastructure required to safely and reliably process and combust biomass at scale. Expanding solid biomass use meaningfully across the California cement industry would require new capital investment of at least $125 million to $175 million, encompassing fuel receiving infrastructure, pre-processing systems, storage systems, conveyance and feed retrofits, burner modifications, emissions control upgrades, and permitting and engineering costs.[73] Accordingly, limiting eligibility to fuel procurement without clearly enabling associated capital expenditures risks rendering this pathway only partially accessible to cement facilities.

### *6.1.2 Electrification Projects*

Electrification is a meaningful decarbonization pathway for many manufacturing sectors. For cement production, however, the dominant source of energy use and combustion emissions is the rotary kiln system, which requires extremely high-temperature heat (approximately 1,450°C in the burning zone). Full electrification of kiln heat remains an exploratory and early-stage concept within the global cement sector (i.e., even pilot-scale electric kilns are years from commercial readiness) and is not presently a commercially deployable pathway at scale.

### *6.1.3 Low-Carbon Hydrogen Procurement*

Hydrogen as a fuel source is an impractical option for cement kilns for several reasons. First, even if there were a commercially viable supply chain for low-carbon hydrogen at the volumes a cement kiln requires, delivery would require major investments in new infrastructure. Most California cement plants are in remote locations and far from any existing or planned hydrogen production hubs. In addition, hydrogen cannot be used as a "drop-in" fuel replacement, as its combustion characteristics (e.g., shorter, more intense flame and generating water vapor rather than $CO_2$) differ significantly from coal or natural gas, which alters heat transfer dynamics and can affect clinker quality. Retrofitting kiln burners and managing these effects would require substantial engineering investments, and we are not aware of any such investments that have been proven at commercial scale.

### 6.1.4 Renewable Electricity Generation or Storage

Onsite renewable electricity generation and storage can reduce indirect emissions associated with purchased electricity. However, electricity use represents a small fraction (approximately 5%) of a cement plant's GHG footprint. Accordingly, while renewable electricity deployment may be beneficial, it does not materially address the core decarbonization challenge facing cement manufacturing.

### 6.1.5 Solar Thermal or Geothermal Energy

Solar thermal and geothermal energy are generally suited to low- or medium-temperature heat applications. Cement kilns, by contrast, require very high-temperature process heat for clinker formation. We are not aware of any commercially demonstrated configurations in which solar thermal or geothermal systems can directly supply the required kiln temperatures at scale.

### 6.1.6 Procurement of Electrified Thermal Energy

The procurement of electrified thermal energy assumes that industrial facilities can substitute purchased electrified heat for onsite fossil fuel combustion. In cement production, kiln heat is generated through tightly integrated combustion systems that are not structured to procure external thermal energy as a commodity. As a result, this pathway has no practical relevance for cement manufacturing under current technical and operational conditions.

### 6.1.7 Summary

While the MDI reflects an important and constructive policy innovation, most of the currently proposed eligible pathways have limited or no applicability to cement production. Of the six pathways that CARB has included in the proposed MDI, only biomass substitution has the potential to significantly reduce GHG emissions in the cement industry, and the GHG reduction potential associated with that one pathway is substantially limited due to a variety of factors (e.g., only addresses combustion emissions, which is one-third of the industry's GHG footprint; can only serve as a partial substitute; and requires integrated capital investments that are outside the scope of the MDI). Simply put, the cement industry represents the majority of GHG emissions targeted by the MDI, yet the design of the MDI only includes one potentially applicable pathway that, at best, might address a fraction of the cement industry's GHG footprint.

## 6.2 Proposed Enhancements

### 6.2.1 Expanding the Scope of Eligible Activities

As demonstrated above, five of the six currently proposed MDI pathways have limited or no applicability to cement production. Yet cement manufacturing accounts for a majority of the GHG emissions among industries potentially eligible for the MDI. A program that cannot meaningfully

serve its largest potential constituent sector is unlikely to achieve its stated objective of driving industrial decarbonization.

The scope of eligible activities should be expanded to include the decarbonization pathways most relevant to cement and other difficult-to-decarbonize industries. At a minimum, this should include:

- **CCUS:** As discussed in Section 4, CCUS is the only pathway capable of addressing the roughly two-thirds of cement GHG emissions that are process emissions. CARB has acknowledged its intent to include CCUS once regulations under SB 905 are developed. CSCME urges CARB not to wait. Even if comprehensive CCUS protocols are not finalized during this rulemaking, the MDI should include CCUS as an eligible project category so that pre-investment activities (e.g., engineering studies, site characterization, permitting, and front-end engineering design) can proceed with MDI support.
- **Lower-Clinker Cement:** While the Proposed Amendments appropriately expand the definition of cement to include blended formulations, the MDI does not include investments needed to unlock blended cements at scale. Significantly expanding blended cement production across the California industry would require new capital investment of at least $100 million to $250 million, including investments in new or expanded SCM silos, grinding equipment additions or modifications, material handling upgrades, blending and quality control systems, electrical and substation upgrades, and laboratory upgrades.[74]
- **Industrial Waste Heat Recovery:** Cement kilns generate substantial waste heat that can be captured and converted to electricity, reducing both direct and indirect emissions. Waste heat recovery systems require significant capital investment in heat exchangers, turbine generators, and associated electrical infrastructure.

Expanding the scope of eligible activities is not a tradeoff. CARB can accommodate the decarbonization pathways most relevant to cement while continuing to support the shorter-term and operational investments in other sectors that the current design appears to be targeting. The alternative is a program that leaves the majority of eligible industrial emissions without a viable pathway to MDI support.

### *6.2.2 Broadening Qualifying Expenditures*

Even where a project falls within an eligible category, the usefulness of the MDI depends on whether the full range of costs required to develop and implement that project are recognized as qualifying expenditures. For capital-intensive decarbonization pathways in the cement sector, a significant share of project cost and risk is incurred well before construction begins, whether it be across engineering studies, feasibility analyses, permitting, site characterization, or front-end engineering design.

More broadly, once a project is deemed eligible, MDI support should extend to the full range of costs directly attributable to planning, developing, implementing, and operating that project. This includes capital expenditures for infrastructure required to support eligible activities, as well as pre-investment costs that are essential to moving a project from concept to final investment decision.

Excluding pre-investment and capital infrastructure costs from the MDI would mean that the program supports only the most straightforward, lowest-risk activities while leaving the highest-barrier investments without support. That outcome is inconsistent with the MDI's stated objective of catalyzing industrial decarbonization.

### *6.2.3 Restructuring MDI Modifiers*

Under the Proposed Amendments, the MDI modifier for industries receiving the standard CAF begins at 1.2 in 2027 and declines by 0.2 points per compliance period. The MDI modifier for industries receiving the alternate CAF (i.e., the industries CARB has classified as difficult to decarbonize due to high leakage risk and high process emissions intensity) begins at 0.6 and declines by 0.1 points per compliance period.

The result is that the industries facing the greatest structural barriers to decarbonization receive the least MDI support. The cement industry, which CARB has classified as hard-to-decarbonize and which accounts for the largest share of emissions among potentially eligible industries, would receive an MDI modifier that is half the size of the modifier available to standard industries. This "inversion" of support is difficult to reconcile with the MDI's stated purpose.

CARB's stated rationale for this structure, as set forth in the ISOR, is that the alternate CAF modifier should be half the standard modifier because the alternate CAF declines at half the rate of the standard CAF. This approach inverts the underlying economic logic. Certain industries are subject to a less stringent CAF trajectory precisely *because* they are hard-to-decarbonize. Likewise, those same industries should be eligible for more MDI support for the same reason.

If the purpose of the MDI is to catalyze decarbonization investment, then the level of MDI support should reflect the scale and complexity of the investments required — not the degree of leakage protection already provided through the base CAF. By CARB's own analysis, hard-to-decarbonize industries face higher abatement costs, longer development timelines, greater technical and financial uncertainty, and fewer near-term abatement options. These are precisely the industries that require greater, not lesser, investment-oriented support.

CSCME recommends that CARB invert the proposed MDI modifier structure so that the higher modifier currently assigned to standard industries applies to industries classified as difficult to decarbonize, and vice versa. This would preserve the overall scale of MDI support while directing greater assistance toward the industries with both the highest leakage risk and the most capital-intensive decarbonization challenges.

### 6.2.4 Replacing Recurring Applications with Durable Eligibility

Under the Proposed Amendments, facilities must apply for MDI participation and satisfy eligibility requirements on a recurring basis aligned with compliance periods. Under Section 95891(g)(5) of the proposed regulation, the Executive Officer establishes application deadlines prior to each compliance period, and facilities that do not apply or are not approved do not receive MDI-associated allowance value for that period.

For capital-intensive projects with multi-year development timelines, recurring application windows introduce uncertainty that is fundamentally incompatible with long-term investment planning. A facility considering a major capital project cannot prudently commit to a decade-long investment if MDI eligibility must be re-established each compliance period. The risk that eligibility could lapse, whether due to administrative delay, shifting criteria, or CARB resource constraints, undermines access to financing for the very projects the MDI is designed to support.

CSCME recommends that CARB establish a one-time application process that confers durable eligibility for the life of the MDI program. Facilities would demonstrate alignment with MDI objectives at the outset and would be subject to ongoing accountability through the reporting and return-of-allowances framework. This approach reduces administrative burden for both CARB and industry while providing the certainty that long-term investment decisions require.

### 6.2.5 Aligning Use & Repayment Timelines

Under the Proposed Amendments, each annual tranche of MDI allowance value is subject to a five-year retention period whose clock starts when CARB allocates the allowances rather than when a facility elects to access or deploy that value toward a qualifying investment. At the end of the five-year window, any MDI allowance value from that tranche that has not been substantiated through qualifying expenditures must be returned through the surrender of an equivalent number of allowances.

This structure creates two related problems. First, it establishes a “use it or lose it” dynamic in which capital must be deployed on CARB’s allocation schedule rather than when projects are ready to proceed. For capital-intensive decarbonization projects involving staged development, extended permitting, and multi-year construction timelines, the five-year window may expire before a project reaches the stage at which capital can be meaningfully deployed.

Second, because MDI allowance value is distributed through the existing free allocation framework and is generally indistinguishable from other allowances once issued, the investment signal is immediately diluted. MDI value that is commingled with compliance allowances is more likely to be treated as near-term compliance or liquidity support rather than strategically reserved for decarbonization investments. This commingling undermines the MDI’s function as an investment-oriented mechanism.

CSCME recommends two modifications. First, repayment timelines should be triggered by when a facility elects to draw on MDI allowance value, not by when that value is initially allocated. Under an "accrued-versus-activated" framework, MDI value would accrue in facility-level accounts, and the five-year spending window would begin only when a facility activates that value toward a qualifying project. This preserves the five-year accountability window while allowing facilities to align the use of MDI support with project readiness.

Second, MDI allowance value should be separately identified and tracked within the existing CITSS. Separate tracking would preserve the investment signal, prevent commingling with compliance allowances, and provide CARB with clear visibility into how MDI value is being used — all without requiring the creation of separate accounts or imposing significant administrative burden.

### *6.2.6 Removing the Historical Baseline for Biomass Procurement*

The procurement of exempt biomass-derived fuels is the MDI pathway most directly relevant to cement production. However, CARB's proposed treatment of biomass procurement includes a structural feature that does not apply to any other eligible pathway: a rolling historical baseline that limits MDI support to incremental biomass usage above a facility's recent history.

Under Section 95891(g)(2)(A) of the proposed regulation, a facility that has used exempt biomass-derived fuels during any of the prior three emissions data years may only apply MDI allowance value to biomass procurement that exceeds the three-year rolling average of its historical usage. The baseline functions as a deductible: each facility must self-fund biomass procurement up to the level of its established baseline before MDI value begins to apply. For facilities with historically high biomass usage, the deductible is large. For facilities with little or no historical biomass usage, the deductible is small or nonexistent.

This baseline structure should be eliminated. CSCME supports the eligibility of biomass procurement under the MDI, as biomass substitution is a meaningful near-term decarbonization pathway for cement manufacturing. Our concern is not with the inclusion of biomass but with a design feature that introduces inequitable treatment, internal inconsistency, and unnecessary administrative complexity into what should be a straightforward and broadly accessible incentive.

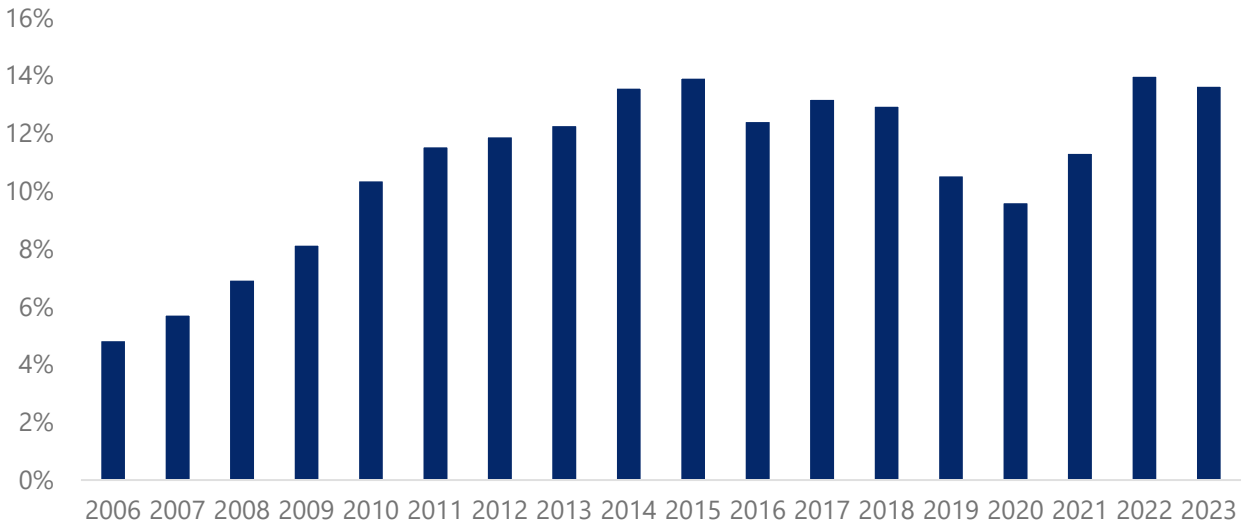
The baseline penalizes early action and rewards delayed adoption. The MDI is designed to accelerate decarbonization. A deductible that scales with historical usage inverts that objective by requiring facilities that invested earliest in fuel switching to self-fund the largest share of their biomass procurement, while facilities that delayed adoption face a lower threshold before MDI support begins. The practical result is that a facility that has been substituting biomass for fossil fuels for years receives less MDI coverage per unit of biomass consumed than a facility that begins doing so only after the MDI takes effect. That outcome differentiates facilities based on past operational decisions rather than forward-looking emissions performance and is inconsistent with the MDI's stated purpose of incentivizing GHG reductions.

The baseline is also internally inconsistent with the MDI's treatment of other pathways. No other eligible activity under the MDI incorporates a historical usage threshold that functions as a deductible. A facility that installs electrified equipment does not need to demonstrate that the investment exceeds some historical level of electrification. For instance, a facility that procures low-carbon hydrogen does not need to show that procurement is incremental to a rolling baseline of prior hydrogen use. Applying a deductible-style baseline to biomass alone creates an asymmetry in program design that lacks a coherent policy justification. If the MDI's objective is to support ongoing decarbonization expenditures, it should do so consistently across pathways.

Furthermore, the baseline increases exposure to biomass market price risk for the facilities least able to absorb it. Government-backed demand for biomass feedstocks under the C&I program will exist across multiple industrial sectors, not just cement. That demand is likely to place upward pressure on biomass prices over time. Under the proposed baseline structure, facilities with the highest historical biomass usage would bear the greatest exposure to price escalation while receiving the least MDI coverage — the deductible is largest where cost exposure is highest. Removing the baseline ensures that MDI value is available to offset increased fuel costs for all facilities proportionate to their actual usage, regardless of when that usage began.

Finally, the baseline creates unnecessary administrative complexity. A rolling three-year average baseline introduces verification requirements, encourages strategic behavior around baseline periods, and complicates the long-term capital planning that expanded biomass utilization requires. A no-baseline structure is simpler to administer, more predictable for facilities, and more consistent with the administratively clean approach that CARB has indicated it prefers.

**Figure 12. California Cement Industry Biogenic Fuel Usage**
Share of Total Cement Industry Thermal Energy, 2006-2023




*Source: CARB (2025). GHG Inventory, Fuel Activity by Sector & Activity (2000 – 2023). Includes industry thermal energy generated from both biogenic & partially biogenic fuels.*

Removing the baseline does not result in retroactive compensation for historical biomass usage. MDI allowance value would apply only to future biomass procurement. Facilities would need to continue or expand biomass substitution to receive MDI support. The incentive structure remains entirely prospective. What changes is the removal of a penalty that differentiates facilities based on the timing of their adoption rather than the scale of their ongoing effort.

CSCME recommends that CARB remove the rolling historical baseline so that MDI support applies to all qualifying biomass procurement by eligible facilities without a deductible. Biomass-related capital expenditures — including the material handling, storage, fuel preparation, feed systems, and safety infrastructure required to expand biomass substitution rates — should also be recognized as qualifying expenditures, consistent with CSCME's broader recommendation to expand the scope of eligible activities and qualifying expenditures under the MDI.

### *6.2.7 Preserving and Redeploying Unused MDI Allowance Value*

Under the Proposed Amendments, MDI allowance value that is not substantiated through qualifying investments within the applicable retention period must be returned to CARB. The proposed regulation does not specify a mechanism for redeploying or reallocating returned allowance value within the MDI.

Because MDI allowance value is initially distributed on the basis of facility output, without regard to whether individual facilities have near-term or medium-term opportunities to deploy that value toward qualifying investments, a material share of the program's nominal value is likely to go unused. This outcome does not necessarily indicate a lack of decarbonization interest or effort. It reflects a predictable mismatch between an output-based distribution mechanism and the uneven timing, cost, and readiness of real-world investment opportunities across eligible industries.

If unused value is permanently removed from the program rather than recycled, the effective scale of the MDI will shrink over time — reducing its ability to support emissions reductions even as investment demand persists or shifts to other facilities within the eligible sector. CSCME recommends that unused MDI allowance value be preserved within the program and, where feasible, redirected through a dedicated redeployment pool toward facilities or sectors with demonstrated investment readiness. Allowance value that remains unused after reasonable opportunities for redeployment should ultimately be returned, ensuring that the MDI remains time-limited and consistent with the overall cap trajectory.

## 6.3 Summary of CSCME Recommendations

For the reasons set forth above, CSCME respectfully urges CARB to:

- Replace recurring applications with durable, one-time eligibility. The existing return-of-allowances mechanism provides sufficient accountability to ensure that MDI value is used as intended without requiring facilities to re-establish eligibility each compliance period.

- Expand the scope of eligible activities to include CCUS, expanded production of lower-clinker cements, and industrial waste heat recovery. The current list of eligible pathways excludes the decarbonization strategies most relevant to the cement industry, which accounts for nearly 60% of GHG emissions among potentially eligible industries.
- Broaden qualifying expenditures to include the full range of costs directly attributable to planning, developing, implementing, and operating eligible projects — including capital expenditures for supporting infrastructure, pre-investment activities (such as engineering studies and permitting), and front-end engineering design.
- Invert the MDI modifier structure so that the higher modifier currently assigned to standard industries applies to industries classified as difficult to decarbonize, and vice versa. The current structure directs less investment support to the industries with the greatest decarbonization challenges — an inversion that is inconsistent with the MDI's stated purpose and conflates leakage protection with investment support.
- Align use and repayment timelines with project readiness by triggering the five-year spending window when a facility activates MDI allowance value, not when it is initially allocated. Separately identify and track MDI allowances within the CITSS to prevent commingling with compliance allowances and preserve the investment signal.
- Eliminate the rolling historical baseline applied to biomass procurement. The proposed three-year baseline functions as a deductible that penalizes early adopters, treats biomass differently from other MDI pathways, and increases exposure to biomass price volatility while adding unnecessary administrative complexity. MDI support should apply to all qualifying future biomass procurement, and biomass-related capital investments required to expand fuel substitution should be recognized as qualifying expenditures.
- Preserve and redeploy unused MDI allowance value through a dedicated redeployment pool rather than permanently removing it from the program. Allowance value that remains unused after reasonable redeployment opportunities are exhausted should ultimately be returned.

More broadly, CSCME urges CARB to approach the MDI as an investment mechanism whose design should reflect the realities of how large industrial decarbonization projects are planned, financed, and executed. The conceptual foundation CARB has established is sound. With the targeted modifications outlined above, the MDI can become a genuinely transformative tool for driving industrial decarbonization in California.

# Section 7: Industrial Allowance Allocation for SCM Producers

CARB's Proposed Amendments would extend industrial allowance allocation to certain producers of SCMs. CARB's approach is based on the premise that SCMs are the "functional equivalent" of cement when used to produce blended products. CSCME respectfully notes that this approach conflicts with the foundational principles of industrial allocation under the C&I program, undermines the incentive that CARB seeks to create by expanding the definition of cement to include SCMs, and increases the risk of leakage in the California cement industry.

## 7.1 Assessment of CARB's Proposed Approach

### *7.1.1 SCMs Are Not the Functional Equivalent of Cement*

SCMs are, by definition, supplementary. They *partially* substitute for clinker in blended cement formulations, and they are not stand-alone binders that can perform the structural and chemical function of clinker-based cement in isolation.

Clinker-based cement is the primary hydraulic binder in concrete. It is the component that drives the chemical hydration process that gives concrete strength and durability. SCMs displace a portion of clinker in blended formulations, but they rely on the presence of clinker to activate their performance characteristics. They do not constitute a complete or independent product equivalent to cement.

Treating SCMs as the "functional equivalent" of cement for purposes of allocation collapses a critical distinction in the cement-concrete supply chain. Cement is manufactured at emissions-intensive, trade-exposed industrial facilities operating kilns with significant process emissions. In contrast, SCM producers are neither manufacturers of finished cement nor emissions-intensive operations. The same applies to concrete batch plants, which produce concrete by "batching" cement, SCMs, aggregates, and water.

Blurring these distinctions for allocation purposes creates a conceptual mismatch between regulatory constructs and industrial reality. The industrial allocation framework is product-based and benchmark-driven. It is not designed to treat upstream clinker production and downstream material blending as interchangeable activities.

### *7.1.2 Free Allocation Is Intended to Minimize Leakage in Exposed Industries*

Under the C&I program, industrial allocation is explicitly justified as a leakage-minimization mechanism for emissions-intensive, trade-exposed sectors. Section 95891 establishes product-based benchmarks and CAFs for industrial sectors in order to mitigate the risk that carbon costs imposed in California will shift production and associated emissions to jurisdictions without comparable constraints. The policy rationale is clear: free allocation is not a general industrial incentive. It is a targeted tool to address leakage risk in sectors that are both (1) emissions-intensive and (2) exposed to interstate or international trade.

SCM production does not meet these criteria:

- SCM production is not process-emissions intensive.
- Many SCMs are industrial byproducts (e.g., fly ash, slag) or low-process materials.
- There is no demonstration in the regulatory record that SCM producers face material leakage risk due to allowance compliance costs.
- The ISOR accompanying the Proposed Amendments does not provide an assessment of leakage exposure for SCM producers.

Absent such an analysis, extending allocation to SCM producers represents a departure from the program's own leakage-based logic.

Moreover, even if CARB were to conduct such an assessment, it is difficult to see how SCM production would qualify as emissions-intensive or meaningfully trade-exposed due to carbon costs. The very premise of SCM use is that it lowers the carbon intensity of cementitious materials. Extending leakage protection to industries not at risk of leakage will undermine the policy rationale for allocation and invite broader challenges to the structure of the program.

### *7.1.3 Allocation to SCM Producers Undermines Incentives to Expand Blended Cements*

CARB has appropriately identified the expansion of blended cement as a critical near-term decarbonization pathway. SB 596 directs CARB to evaluate and implement measures to reduce the greenhouse gas intensity of cement used in California and to support market demand for lower-carbon cementitious products.

We understand that CARB's objective in this context is to ensure that the incentive to produce blended cement is not sensitive to where blending occurs in the supply chain. However, industrial allowance allocation is not the appropriate mechanism to achieve downstream demand incentives.

Under the proposed approach, if SCM producers receive allocation when selling to concrete batch plants or other downstream entities, allowance value effectively shifts away from clinker manufacturing facilities and toward activities that are neither emissions-intensive nor leakage-exposed. This does not strengthen the decarbonization signal for cement producers. It weakens it.

The core purpose of expanding the definition of cement is to ensure that cement manufacturers can receive allocation based on lower-clinker blended products. That objective can be accomplished within the cement benchmark framework, without extending allocation to non-cement producers. Providing allocation to SCM producers creates a workaround that:

- Diverts allowance value away from clinker facilities that face genuine leakage risk;
- Complicates benchmark administration and product accounting; and

- Undermines the integrity of the product-based allocation structure.

In effect, the proposal attempts to use a leakage-mitigation tool to solve a downstream demand problem. Those are distinct policy challenges that warrant distinct policy instruments.

### *7.1.4 Industrial Allocation Is Not the Proper Tool to Drive Downstream Demand*

If CARB's objective is to accelerate the adoption of blended cement in the concrete market, there are more direct and transparent tools available. These include:

- Procurement standards and performance-based specifications;
- Carbon intensity disclosure requirements (e.g., EPD-based policies); and
- Advanced market commitments or targeted demand-side incentives.

Industrial allowance allocation is designed to minimize leakage, not to subsidize input materials or restructure supply-chain incentives.

## 7.2 Summary of CSCME Recommendations

For these reasons, CSCME respectfully urges CARB to:

- Refrain from extending industrial allocation to SCM producers.[75]
- Explore alternative, demand-side mechanisms to increase blended cement adoption downstream in lieu of industrial allowance allocation.

This approach would preserve the integrity of the leakage-protection framework, avoid distortions in the supply chain, and more cleanly align policy and program design.

## Section 8: Import Reporting Requirements

The MRR Proposed Amendments establish new MRR reporting requirements for cement importers that take effect with data year 2027. Specifically, importers will be required to report the annual GHG emissions associated with imported cement and clinker from each manufacturing facility, calculated as the product of the quantity imported and the facility's cement GHG emissions intensity ("CEI").

Where facility-specific data is known, the CEI is calculated as total facility emissions divided by total production. Where facility-specific data is not known, CARB proposes a default CEI of 0.758 MT of $CO_2e$ per short ton. Importers are also required to report the quantities of cement and clinker imported by facility, the component materials (when known), the data sources and methods used, and the name and address of the manufacturing facility (if known). Reported data is exempt from third-party verification.

### 8.1 Assessment of the Proposed Approach

CSCME supports CARB's proposal to establish new MRR reporting requirements for cement importers. The collection of data on the volume, origin, and GHG emissions associated with imported cement is a constructive and necessary first step — both for informing the design and implementation of a border carbon adjustment, as discussed in Section 3, and for fulfilling the legislative mandate of SB 596 to develop a strategy for achieving net-zero emissions from all cement consumed in California, including imported cement.

That said, CSCME has identified several areas in which the proposed requirements could be strengthened to produce more useful and reliable data, better align with the eventual implementation of a BCA, and more accurately characterize the GHG footprint of imported cement. This section assesses the proposed approach, identifies specific enhancements, and concludes with a summary of CSCME's recommendations.

First, a single default factor collapses several distinct sources of GHG emissions (process emissions, kiln combustion emissions, non-kiln combustion emissions, electricity-related emissions, and transportation-related emissions) into a single number. While this approach has the virtue of simplicity, it does not allow CARB to distinguish between the components of an imported product's GHG footprint that are amenable to reporting and verification and those that are not. Process emissions, for example, are driven by well-understood chemistry and can be estimated with reasonable confidence based on clinker content alone. Kiln combustion emissions, by contrast, are a function of plant-specific kiln efficiency and fuel mix — variables that differ substantially across facilities and countries. A single aggregated default cannot capture these differences and provides no pathway for importers to demonstrate that their actual emissions profile differs from the default.

Second, the single default factor does not include transportation-related GHG emissions, which represent a material component of the total GHG footprint of imported cement. California cement producers effectively incur zero transportation-related GHG costs for delivering product to the California market (their product "enters" the market at the plant gate). Imported cement, by contrast, must be shipped, typically by ocean-going vessel over thousands of miles. Excluding transportation emissions from the reporting framework understates the true GHG footprint of imported cement and creates a gap in the data that will need to be addressed if and when import reporting transitions to a compliance framework.

Third, the proposed default factor appears to be based on a methodology that approximates the GHG intensity of a representative cement plant but does not account for the fact that the plants actually exporting to California may have materially different emissions profiles. The MRR ISOR indicates that the methods used to calculate the default factor are provided in the Technical Support Document, but the relationship between the default and the actual emissions of the primary exporting countries (e.g., China, Vietnam, Thailand, Mexico) over the past several years is not transparent in the regulatory record.

The absence of third-party verification creates a data reliability gap. CARB proposes that cement importer data not be subject to verification because the data is "based on best available data and not subject to a Cap-and-Invest Program compliance obligation." CSCME understands CARB's rationale: verification requirements are typically tied to compliance obligations, and imposing verification on a reporting-only framework could be seen as disproportionate. However, the practical consequence is that the data collected under Section 95126 will be self-reported, unverified, and of uncertain reliability, which will limit its usefulness both for policy analysis and as a foundation for a future BCA.

This concern is particularly acute with respect to the facility-specific CEI calculation. Under the proposed framework, an importer who claims to know the annual GHG emissions and production of a foreign manufacturing facility can calculate and report a facility-specific CEI with no external check on the accuracy of that claim. The incentive structure is clear: importers who report a lower-than-default CEI face no consequences for inaccuracy, while importers who cannot or do not report facility-specific data are assigned the default. Without some form of data quality assurance — whether through full third-party verification, a simplified attestation process, or CARB staff review of reported methodologies — the facility-specific pathway is vulnerable to systematic underreporting.

CSCME is not suggesting that CARB impose the same rigorous verification standards that apply to California cement producers. We recognize that requiring third-party verification of foreign plant data would be impractical in the near term in the absence of applying compliance obligations. But there is a middle ground between no verification and full verification. Finding that middle ground is essential if the data is to serve as the foundation for a credible BCA.

The definition of "importer of cement" requires clarification. The proposed definition identifies the reporting entity as the owner or operator of a cement terminal receiving imported cement or clinker (if the terminal owner/operator owns the product), or the first entity that owns and receives the imported cement or clinker in California (if the terminal owner/operator does not own the product). This definition is workable in most cases, but it may create ambiguity in situations involving intermediate ownership transfers, consignment arrangements, or cases where the first California recipient is a ready-mix concrete producer or other downstream entity that may not have the technical capacity to calculate and report GHG emissions from the upstream manufacturing facility.

CSCME recommends that CARB work with industry stakeholders to clarify the definition and, where necessary, develop guidance on how the reporting obligation applies in common but potentially ambiguous transaction structures. The goal should be to ensure that the definition captures the vast majority of import volumes without creating compliance confusion for entities that are not well-positioned to report upstream manufacturing data.

## 8.2 Proposed Enhancements

CSCME proposes the following enhancements to strengthen the import reporting framework and better position it to serve as the foundation for a future BCA.

### *8.2.1 Adopt a Components-Based Approach to Default Emissions Factors*

Rather than relying on a single aggregated default, CARB should decompose the GHG footprint of imported cement into its primary components and establish separate default factors for each. As CSCME has detailed in prior submissions, the total GHG intensity of imported cement can be expressed as:

Total GHG Intensity = C × (P + K + N + E + T)

Where C is the clinker ratio, P is the process emissions factor, K is the kiln combustion emissions factor, N is the non-kiln combustion emissions factor, E is the electricity-related emissions factor, and T is the transportation-related emissions factor.

This decomposition has several advantages. Each component can be individually estimated using credible, transparent data sources.

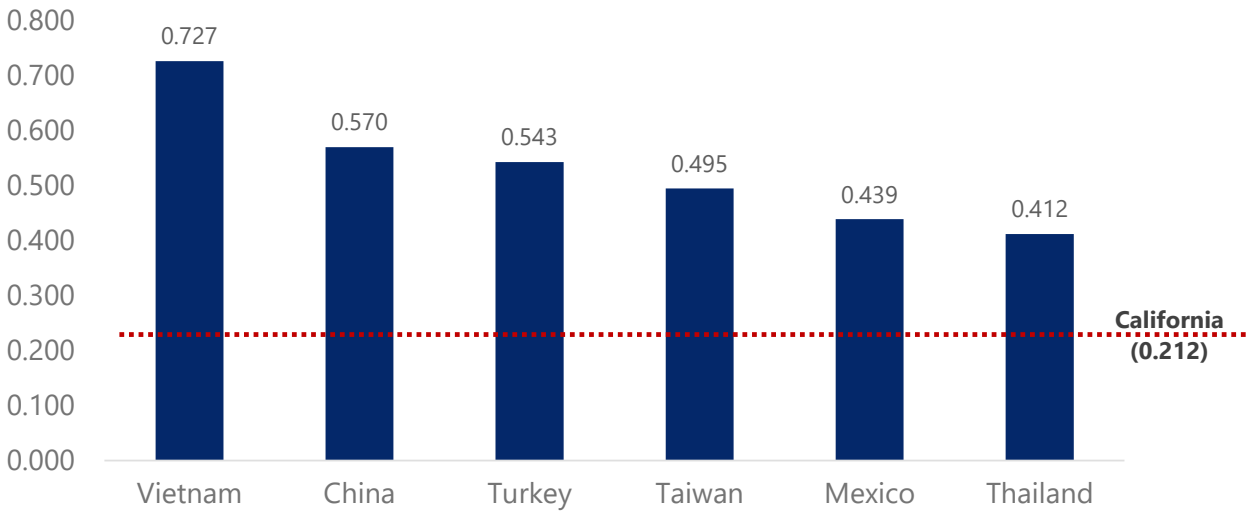
- Process emissions (P) are driven by well-established chemistry and can be reliably estimated at 0.547 MT of $CO_2e$ per MT of clinker based on the CSI protocol.[76]
- Kiln combustion emissions (K) can be conservatively estimated based on the energy efficiency of modern pre-heater, pre-calciner kilns and EPA-published emissions factors for coal combustion.[77]

- Electricity-related emissions (E) can be estimated using country-specific grid emissions factors published by the International Energy Agency or other credible sources.[78]
- Transportation emissions (T) can be estimated using the International Maritime Organization's default factors for dry bulk carriers and publicly available port-to-port distances.[79]

Critically, the components-based approach creates a natural pathway for importers to provide actual data that overrides individual default assumptions. An importer who can document a lower clinker ratio, a more efficient kiln, or a less carbon-intensive fuel mix can submit that data to reduce the applicable default for the relevant component, while the remaining components continue to use default values. This provides a meaningful incentive for data transparency without requiring importers to produce a comprehensive, facility-level emissions inventory.

CSCME recommends that CARB adopt a components-based default methodology in the final MRR amendments or commit to doing so in a near-term 15-day change. The analytical framework and recommended default values for each component have been provided in prior CSCME submissions.

**Figure 13. Grid GHG intensity by Cement Importer into California**
Estimated per $CO_2e$ per MWh of Electricity Usage



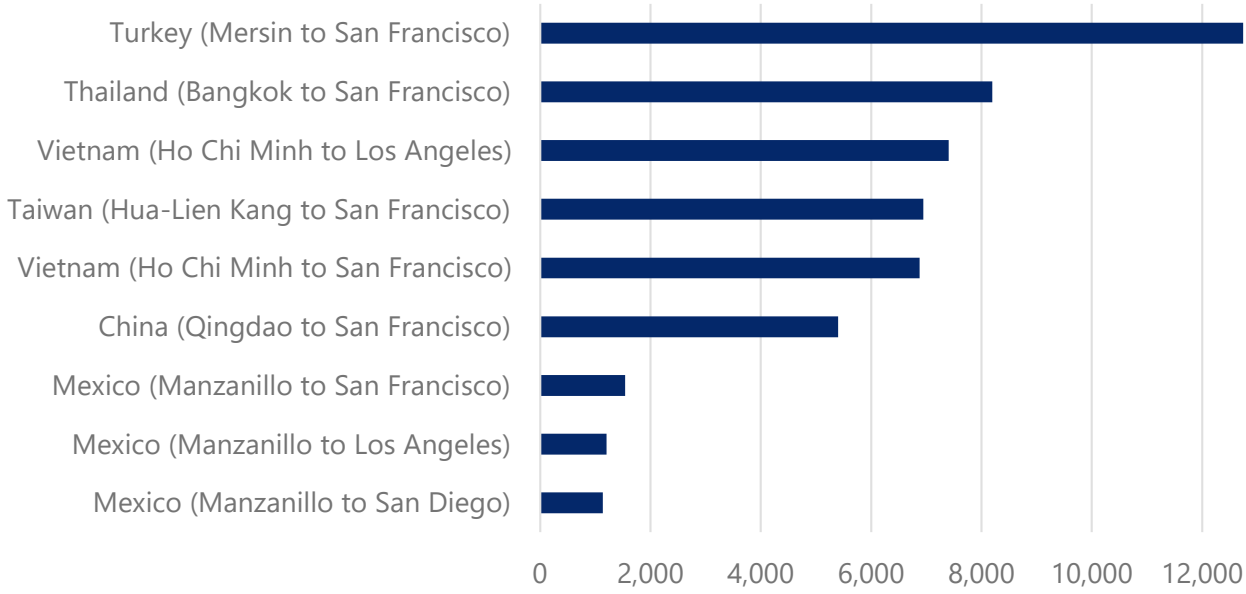

*Sources: International Climate Initiative Vietnam (2024). Viet Nam's 2023 Updated Grid Emission Factor signifies lower electricity emissions; GHG Protocol (2024). Emissions Factors for Cross Sector Tools, V2.0; Climatiq (2024). Emissions Factor – Electricity Supplied from Grid (derived from International Energy Agency data).*

### *8.2.2 Include Transportation-Related Emissions in the Reporting Scope*

The GHG emissions associated with shipping cement to the California market are a material and readily quantifiable component of the imported product's total footprint. Excluding transportation emissions from the reporting framework creates an incomplete picture of the comparative GHG intensity of imported versus domestic cement and will complicate the eventual implementation of a BCA that accounts for all emissions sources.

CSCME recommends that CARB require importers to report the port of origin and mode of transportation for imported cement and clinker, and that CARB use this data in conjunction with publicly available emissions factors and distance data to calculate the transportation-related emissions associated with each import shipment. This approach places minimal additional burden on importers (who already know the origin of their product) while producing data that is essential for a comprehensive assessment of the GHG footprint of imported cement.

**Figure 14. Port-to-Port Distances for California Cement Importers**
Nautical Miles




*Source: National Geospatial-Intelligence Agency (2001). Pub. 151: Distances Between Ports.*

### *8.2.3 Establish a Data Quality Assurance Mechanism for Facility-Specific CEI Reporting*

As discussed above, the absence of any verification or quality assurance for facility-specific CEI data creates a reliability gap that will undermine the usefulness of the data collected. CSCME recommends that CARB implement a tiered data quality assurance approach.

At a minimum, importers who report a facility-specific CEI below the default should be required to provide supporting documentation that identifies the data sources and quantification methodologies used, along with an attestation that the reported data is accurate and complete to the best of the reporter's knowledge. CARB staff should have the authority to review and challenge reported values that appear inconsistent with known emissions profiles for the relevant region and kiln technology.

Over time, as the reporting framework matures and the transition to a compliance-based BCA approaches, CARB should consider establishing more rigorous data quality tiers that provide importers with graduated incentives to submit higher-quality data. For example, data that has

been verified by an accredited third party could qualify for a more favorable treatment under the BCA, while unverified data would be subject to the default assumptions. This structure mirrors the approach CARB has successfully employed in other program contexts and would create a self-reinforcing dynamic in which data quality improves as the compliance stakes increase.

### *8.2.4 Explicitly Link the Reporting Framework to a BCA Implementation Timeline*

The proposed MRR amendments are presented as a standalone data collection exercise. The ISOR states that the focus is on "assessing and collecting what data is available" and that import data is "not subject to a Cap-and-Invest Program compliance obligation."[80] While this framing may be appropriate for the initial reporting phase, the absence of any explicit connection between the reporting framework and the eventual implementation of a BCA weakens the signal the framework sends to the market.

CSCME urges CARB to make this connection explicit in the regulatory record and to commit to a timeline for transitioning from a reporting-only framework to a compliance-based BCA. Even a general commitment (e.g., that CARB intends to propose compliance obligations for imported cement within a specified timeframe from the reporting framework's commencement) would provide the market with a credible signal that California is serious about leveling the playing field and would give importers a reason to invest in the data infrastructure necessary to comply with future obligations.

Without that signal, the reporting framework risks being perceived as an end in itself rather than a step toward closing the carbon loophole and leveling the playing field for cement.

## 8.3 Summary of CSCME Recommendations

For the reasons set forth above (and further elaborated in CSCME's comments on the MRR Proposed Amendments), CSCME respectfully urges CARB to:

- Adopt a components-based default methodology that decomposes the GHG footprint of imported cement into process emissions, kiln combustion emissions, non-kiln combustion emissions, electricity-related emissions, and transportation-related emissions, with separate default factors for each component. This approach produces more useful data, creates a natural pathway for importers to provide actual data, and aligns the reporting framework with the eventual implementation of a BCA.
- Include transportation-related emissions in the reporting scope. Require importers to report the port of origin and mode of transportation, and use publicly available data to calculate the transportation component of each import shipment's GHG footprint.
- Establish a data quality assurance mechanism for facility-specific CEI reporting that, at a minimum, requires supporting documentation and attestation and that provides CARB with

the authority to review and challenge reported values. Over time, develop graduated data quality tiers that provide importers with incentives to submit higher-quality data.

- Clarify the definition of "importer of cement" to address ambiguities involving intermediate ownership transfers, consignment arrangements, and downstream purchasers who may not be well-positioned to report upstream manufacturing data.
- Explicitly link the reporting framework to a BCA implementation timeline. Make clear in the regulatory record that import reporting is a precursor to a compliance-based BCA, and commit to a general timeline for transitioning from reporting to compliance obligations.

CSCME views the proposed import reporting requirements as an important foundation, but a foundation is only as valuable as what is built upon it. The reporting framework should be designed not merely to collect data for its own sake, but to produce the specific types of data, in the specific formats, at the level of quality needed to support the implementation of a credible and effective incremental BCA.

Please see CSCME's comment letter on the Proposed Amendments to the MRR regulation for additional detail regarding structuring the cement importer reporting requirement.

## Section 9: Conclusion

The California cement industry arrived at this rulemaking as an industry that helped build the C&I program, supported its extension twice, committed to carbon neutrality by 2045, and worked with legislators and regulators to enact the statutory framework that is supposed to guide these amendments.

The California cement industry has reduced total emissions by roughly one-third since the adoption of AB 32. We have invested in operational improvements while competing against imports that bear none of the costs we face. And we have done so while watching four cement plants close and import market share climb to more than a quarter of California consumption.

The Proposed Amendments will define the competitive and decarbonization landscape for the cement industry through 2035 and beyond. As currently designed, the Proposed Amendments widen rather than narrow the gap between what the program demands of the California cement industry and what it demands of imports. They reduce the industry's allowance allocation while offering an MDI that excludes the pathways most relevant to cement and provides less support to the industries that need it most. And they remain silent on CCUS — the single technology without which the cement industry cannot reach carbon neutrality.

These are manageable problems. Close the carbon loophole. Pause the decline in allocations and provide leakage protection until an incremental BCA is operational. Redesign the MDI so it works for the industries it is intended to serve. And begin building the regulatory foundation for CCUS now, not after the window for achieving carbon neutrality by 2045 has closed.

CSCME remains committed to working collaboratively and constructively with CARB to get this right. The C&I program can be the engine of industrial decarbonization in California — but only if it is designed to reflect the practical realities of the industries that it regulates.

## Endnotes

[1] The Coalition includes CalPortland Company, Cemex, Inc., Mitsubishi Cement Corporation, National Cement Company of California Inc., and UNACEM North America. There are seven cement plants currently in operation in California with locations in Lebec, Lucerne Valley, Mojave, Oro Grande, Redding, Tehachapi, and Victorville.

[2] California Nevada Cement Association (July 2023). Achieving Carbon Neutrality in the California Cement Industry: Key Barriers & Policy Solutions. Second Edition. Available at https://www.cncement.org/resource-library/achieving-carbon-neutrality-for-california-cement-producers.

[3] SB 596 was sponsored by Senator Becker, passed the legislature with a supermajority in both chambers, and was supported by a diverse coalition of industry and environmental stakeholders.

[4] CARB (Mar 2025). Draft SB 596 Cement Strategy, pp. 87 ("A single cement decarbonization project can require multiple permits and must comply with applicable rules, each of which can require time and resources. Each permit process and rule are governed by different authorities with different timelines.")

[5] CARB (Dec 2022). 2022 Scoping Plan for Achieving Carbon Neutrality, Executive Summary, pp. 2 ("Despite these world-leading efforts, some amount of residual emissions will remain from hard-to-abate industries such as cement, internal combustion vehicles still on the road, and other sources of GHGs.")

[6] CARB (Mar 2025). Draft SB 596 Cement Strategy, pp. 8 ("The 2022 Scoping Plan Update recognizes the cement sector as a hard-to-decarbonize sector, as its manufacturing is associated with high heat to process feedstock, which releases additional inherent carbon dioxide when heated.")

[7] There are four industries in California that share these characteristics (cement, manufacturing, lime manufacturing, nitrogenous fertilizers and coke calcining) and, therefore, receive an alternative CAF in recognition of their hard-to-abate status. However, the other three industries are exceptionally small. For instance, based on 2024 MRR data, the cement industry represents more than 99.6% of GHG emissions among all hard-to-abate industries.

[8] CARB (Oct 2010). Proposed Regulation to Implement the California Cap-and-Trade Program. Appendix K. Leakage Analysis. Table K-4: Proposed Emissions Intensity Classification, pp. K-15

[9] CARB (Oct 2010). Proposed Regulation to Implement the California Cap-and-Trade Program. Appendix K. Leakage Analysis. Table K-4: Proposed Emissions Intensity Classification, pp. K-15 ("Industries with higher emissions intensities are more sensitive to the effects of cost pass-through ability than industries with low or medium emissions intensities. This result implies that emissions intensity should be given greater weight in the leakage classification, especially when there is uncertainty in the level of cost pass-through ability.")

[10] CARB (Mar 2025). Draft SB 596 Cement Strategy, pp. 17–18. In 2019, process emissions from limestone calcination accounted for 4,917,548 $MTCO_2e$ versus 2,850,122 $MTCO_2e$ from fuel combustion.

[11] Cement consumption calculated using a combination of historical annual data (United States Geological Survey (2013 – 2023), Minerals Yearbook, Cement, Table 9: Cement Shipments to Final Customer, by Destination & Origin) and more recent monthly data (United States Geological Survey (Jan 2024 – Nov 2025), Minerals Industry Survey, Cement, Table 2a: Portland Cement Shipments, by Destination & Table 2b: Blended Cement Shipments, by Destination)

[12] International Trade Commission (Jan 2013 – Dec 2025), Imports: For Consumption to California Customs Districts (Los Angeles, CA; San Diego, CA; San Francisco, CA), HTS Code 2523, C.I.F. Value & First Unit of Quantity.

[13] CARB (Oct 2010). Proposed Regulation to Implement the California Cap-and-Trade Program. Appendix K. Leakage Analysis. Table K-4: Proposed Emissions Intensity Classification, pp. K-15

[14] United States Geological Survey (2000 – 2023), Minerals Yearbook, Cement, Table 9: Cement Shipments to Final Customer, by Destination & Origin.

[15] SB 596 (Becker, Chapter 240, Statutes of 2021). Codified at California Health & Safety Code §38561.2(b)(4).

[16] SB 596 (Becker, Chapter 240, Statutes of 2021). Codified at California Health & Safety Code §38561.1(a)(3).

[17] SB 596 (Becker, Chapter 240, Statutes of 2021). Codified at California Health & Safety Code §38561.1(a)(4).

[18] SB 596 (Becker, Chapter 240, Statutes of 2021). Codified at California Health & Safety Code §38561.1(a)(5).

[19] SB 596 (Becker, Chapter 240, Statutes of 2021). Codified at California Health & Safety Code §38561.1(b)(6).

[20] SB 596 (Becker, Chapter 240, Statutes of 2021). Codified at California Health & Safety Code §38561.1(b)(7).

[21] CSCME (2026). Confidential Survey of Members Regarding Decarbonization Barriers, Investments, & Impacts. To support comments on this rulemaking, CSCME surveyed member companies on a wide range of topics, including but not limited to the extent to which C&I compliance costs have impacted investment decisions, the extent to which they applied for federal grant funding under industrial decarbonization programs, and the amount and types of new capital investments needed to unlock key decarbonization pathways such as increased blended cement production and biomass fuel use. Survey responses were collected on a confidential basis, and individual company responses were not disclosed to other CSCME member companies.

[22] United States Geological Survey (2000 – 2023), Minerals Yearbook, Cement, Table 3: Portland & Blended Cement Production, Capacity, & Stocks in the United States, by District.

[23] United States Geological Survey (Jan 2024 – Dec 2024), Minerals Industry Survey, Cement, Table 1a: Portland & Blended Cement Shipments, by District of Origin

[24] CARB (2025), California's AB 32 GHG Emissions Inventory by Scoping Plan Category, 2025 Edition: 2000 – 2023; CARB (2025), 2024 GHG Facility and Entity Emissions.

[25] Cement production calculated using a combination of annual historical data (United States Geological Survey (2008 – 2023), Minerals Yearbook, Cement, Table 3: Portland & Blended Cement Production, Capacity, & Stocks in the United States, by District) and more recent monthly data (United States Geological Survey (Jan 2024 – Dec 2024), Minerals Industry Survey, Cement, Table 1a: Portland & Blended Cement Shipments, by District of Origin).

[26] Cement industry emissions calculated using a combination of annual historical data (California Air Resources Board (2025), California's AB 32 GHG Emissions Inventory by Scoping Plan Category, 2025 Edition: 2000 – 2023) and the most recent vintage of facility-level emissions data (California Air Resources Board (2025), 2024 GHG Facility and Entity Emissions).

[27] Ibid. Calculations assume that process emissions account for 0.54 MT GHG $CO_2e$ per MT of clinker and the clinker-to-cement ratio remained relatively constant over this timeframe.

[28] CARB (Mar 2025). Draft SB 596 Cement Strategy, pp. 19 (Figure 6 and surrounding text).

[29] United States Geological Survey (2000 – 2023), Minerals Yearbook, Cement, Table 9: Cement Shipments to Final Customer, by Destination & Origin.

[30] International Trade Commission (Jan 2000 – Dec 2025), Imports: For Consumption to California Customs Districts (Los Angeles, CA; San Diego, CA; San Francisco, CA), HTS Code 2523, C.I.F. Value & First Unit of Quantity.

[31] United States Geological Survey (2000 – 2023), Minerals Yearbook, Cement, Table 9: Cement Shipments to Final Customer, by Destination & Origin.

[32] International Trade Commission (Jan 2013 – Dec 2025), Imports: For Consumption to California Customs Districts (Los Angeles, CA; San Diego, CA; San Francisco, CA), HTS Code 2523, C.I.F. Value & First Unit of Quantity.

[33] United States Geological Survey (2000 – 2023), Minerals Yearbook, Cement, Table 9: Cement Shipments to Final Customer, by Destination & Origin

[34] International Trade Commission (Jan 2013 – Dec 2025), Imports: For Consumption to California Customs Districts (Los Angeles, CA; San Diego, CA; San Francisco, CA), HTS Code 2523, C.I.F. Value & First Unit of Quantity.

[35] CSCME (2026). Confidential Survey of Members Regarding Decarbonization Barriers, Investments, & Impacts.

[36] GHG intensity calculated by dividing reported covered GHG emissions (CARB (2025), California's AB 32 GHG Emissions Inventory by Scoping Plan Category, 2025 Edition: 2000 – 2023) by reported cement output (United States Geological Survey (2008 – 2023), Minerals Yearbook, Cement, Table 3: Portland & Blended Cement Production, Capacity, & Stocks in the United States, by District). Annual allowance allocation rate calculated using product benchmark, industry assistance factor, and annual cap adjustment factor in the current version of the cap-and-invest regulation (CARB (2018). Regulation for the California Cap on Greenhouse Gas Emissions and Market-Based Compliance Mechanisms).

[37] CARB (Feb 2026). California Cap-and-Invest Program: Summary of California-Quebec Joint Auction Settlement Prices & Results.

[38] CARB (Jan 2026). Proposed Amendments to the California Cap on Greenhouse Gas Emissions and Market-Based Compliance Mechanisms Regulation, Appendix A-1: Proposed Regulation Order

[39] CSCME (2026). Confidential Survey of Members Regarding Decarbonization Barriers, Investments, & Impacts.

[40] CARB (Oct 2010). Proposed Regulation to Implement the California Cap-and-Trade Program. Appendix K. Leakage Analysis, pp. 33.

[41] CARB (Dec 2010). California Cap-and-Trade Program. Resolution 10-42, pp. 4.

[42] CARB (Dec 2010). California Cap-and-Trade Program. Resolution 10-42, pp. 11.

[43] AB 32 (Núñez and Pavley, Chapter 488, Statutes of 2006). Codified at California Health & Safety Code §38562(b)(8).

[44] AB 398 (Garcia, Chapter 135, Statutes of 2017), as codified at California Health & Safety Code §38591.2(c) (requiring CARB to report to the Legislature by December 31, 2025, on program progress and to "recommend necessary statutory changes to the program to reduce emissions leakage" including "the potential for a border carbon adjustment").

[45] SB 596 (Becker, Chapter 240, Statutes of 2021). Codified at California Health & Safety Code §38561.2(b)(4).

[46] CARB (Feb 2022). CARB GHG Electricity Accounting. Accessed here.

[47] CARB (Nov 2025). Overview of the Low Carbon Fuel Standard.

[48] University of Columbia Sabin Center for Climate Change Law (Sep 2013). Ninth Circuit Rejects Constitutional Challenge to California's Low Carbon Fuel Standard

[49] Ibid.

[50] CARB (Jan 2026). Initial Statement of Reasons, Proposed Amendments to the Cap-and-Invest Program, at 340 ("elimination of free allocation before replacement with some other mechanism to minimize leakage could have greater impacts on some industries, state and local economies, and jobs under a more stringent Program as proposed in this staff report.").

[51] CSCME (Apr 2025). The California Cement Industry's Comments on Draft Net-Zero Greenhouse Gas Emissions Strategy for the California Cement Sector under SB 596.

[52] CARB (Dec 2022). 2022 Scoping Plan for Achieving Carbon Neutrality, pp. 86.

[53] CARB (Mar 2025). Draft SB 596 Cement Strategy, pp. 54.

[54] CARB (2025), California's AB 32 GHG Emissions Inventory by Scoping Plan Category, 2025 Edition: 2000 – 2023.

[55] U.S. Department of Energy, National Energy Technology Laboratory (2023). Analysis of Carbon Capture Retrofits for Cement Plants.

[56] U.S. Department of Energy, National Energy Technology Laboratory (2023). Analysis of Carbon Capture Retrofits for Cement Plants.

[57] U.S. Department of Energy, National Energy Technology Laboratory (2023). Analysis of Carbon Capture Retrofits for Cement Plants.

[58] Offshore Engineer Magazine (2020). Norway to Launch $2,7B Carbon Capture and Storage Project 'Longship'. https://www.oedigital.com/news/481822-norway-to-launch-2-7b-carbon-capture-and-storage-project-longship

[59] CSCME (2026). Confidential Survey of Members Regarding Decarbonization Barriers, Investments, & Impacts.

[60] CSCME (2026). Confidential Survey of Members Regarding Decarbonization Barriers, Investments, & Impacts.

[61] CSCME (Oct 2025). The California Cement Industry's Comments on California's Carbon Capture, Removal, Utilization, and Storage Program (SB 905)

[62] CSCME (2026). Confidential Survey of Members Regarding Decarbonization Barriers, Investments, & Impacts.

[63] C&I Proposed Amendments § 95802(a).

[64] C&I ISOR at 63.

[65] CSCME proposes to include "process material additives" as an additional category of materials (similar to baghouse dust and grind aids) that are "currently blended by cement plants with clinker and other mineral additives to make cement. This change ensures that they are included in the definition and support product-based industrial allowance allocation for these materials as part of cement." ISOR at 84.

[66] C&I Proposed Amendments § 95802(a); MRR Proposed Amendments § 95102(a).

[67] MRR Proposed Amendments § 95102(a).

[68] *See* C&I Proposed Amendments § 95802(a); MRR Proposed Amendments § 95102(b).

[69] CARB (2018). Regulation for the California Cap on Greenhouse Gas Emissions and Market-Based Compliance Mechanisms, Table 8-1: Assistance Factors and Covered Industrial Sectors, pp. 154

[70] CARB (Oct 2010). Proposed Regulation to Implement the California Cap-and-Trade Program. Appendix K. Leakage Analysis. Table K-4: Proposed Emissions Intensity Classification, pp. K-15

[71] CARB (Jan 2026). Proposed Amendments to the California Cap on Greenhouse Gas Emissions and Market-Based Compliance Mechanisms Regulation: Initial Statement of Reasons. pp. 60

[72] CARB (Jan 2026). Proposed Amendments to the California Cap on Greenhouse Gas Emissions and Market-Based Compliance Mechanisms Regulation: Initial Statement of Reasons. Table 6: Ratio of Industrial Allocation to Covered Emissions in Various Jurisdictions (2023). pp. 60

[73] CSCME (2026). Confidential Survey of Members Regarding Decarbonization Barriers, Investments, & Impacts.

[74] CSCME (2026). Confidential Survey of Members Regarding Decarbonization Barriers, Investments, & Impacts.

[75] To implement this recommendation, CARB should: (1) remove the proposed revision in Section 95891 of the C&I Proposed Amendments to the variable $O_{a,\,t\text{-}2}$; (2) remove the rows in Table 8-1 of the C&I Proposed Amendments for "Mining (except oil and gas) for Supplementary Cementitious Materials" and "Nonmetallic Mineral Product Manufacturing for Supplementary Cementitious Materials"; (3) remove the rows in Table 9-1 of the C&I Proposed Amendments in the Cement Manufacturing NAICS Sector Definition for "Mining (except oil and gas) for Supplementary Cementitious Materials" and "Nonmetallic Mineral Product Manufacturing for Supplementary Cementitious Materials"; (4) delete the proposed Section 95110(5) and insert: "Annual quantity of SCMs consumed for blending (short tons) by SCM type."; and (5) delete Section 95115(22) of the MRR Proposed Amendments.

[76] World Business Council for Sustainable Development (May 2011). Cement Sustainability Initiative. CO2 & Energy Accounting & Reporting Standard for the Cement Industry. pp. 9

[77] United States Environmental Protection Agency (Jan 2025). 2025 GHG Emissions Factors Hub.

[78] International Energy Agency (2025). Emission Factors 2025. Paid data product.

[79] International Maritime Organization (2020). Forth IMO GHG Study. Annex O: Detailed Bottom-Up Results.

[80] CARB (Jan 2026). Proposed Amendments to the Regulation for the Mandatory Reporting of Greenhouse Gas Emissions. Initial Statement of Reasons. pp. 26-27