Coalition for Sustainable Cement Manufacturing & Environment
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April 10, 2017

Ms. Mary Nichols
Chair
California Air Resources Board
1001 "I" Street
Post Office Box 2815
Sacramento, California 95812

Subject: **Comments on the 2017 Climate Change Scoping Plan Update**

Dear Ms. Nichols:

The Coalition for Sustainable Cement Manufacturing and Environment ("CSCME"), a coalition of all five cement manufacturers in California,[1] provides these comments regarding the 2017 Climate Change Scoping Plan Update issued on January 20, 2017 ("Scoping Plan Update") by the California Air Resources Board ("CARB").

Although it supports the existing Cap-and-Trade Program, CSCME opposes the continuation of the Cap-and-Trade Program without significant changes to the post-2020 proposed allowance allocation framework for the cement industry. Absent such changes, California cement production will virtually disappear, harming the industry's workers and the communities that they support, shifting California cement consumption toward more GHG-intensive imports, and undermining California's climate change objectives.

CARB's allowance allocation framework under the Cap-and-Trade Program as well as any additional policies and measures must comply with the requirements under AB 32, including but not limited to equitably minimizing costs and maximizing benefits, considering cost-effectiveness, considering overall societal benefits, and minimizing leakage. The proposed allowance allocation framework represents a significant departure from the current approach and fails to satisfy AB 32's mandate to, among other things, minimize leakage. Our future support for the Cap-and-Trade Program, whether under CARB's Proposed Scenario or under Alternative 3 as set forth in the Scoping Plan Update, is contingent on the implementation of an allowance allocation program that ensures the survival of our industry.

CARB also committed to considering a border carbon adjustment ("BCA") for the cement industry to minimize the leakage that necessarily results as the cap adjustment factor reduces the allocation of allowances. CSCME was given assurances that, in the absence of a BCA, the allowance allocation framework would effectively address the increasing future risk of leakage and ensure that the cement industry is not driven out of California. CSCME urges CARB to reconsider the use of an incremental BCA

[1] The Coalition includes CalPortland Company, Cemex, Inc., Lehigh Southwest Cement Company, Mitsubishi Cement Corporation, and National Cement Company of California Inc. There are ten cement plants located in California, eight of which are currently operating.

as an additional measure to comply with CARB's statutory obligations to, among other things, minimize leakage.

The comments below will address, first, why CARB's proposed allocation framework threatens the survival of the cement industry in California, including why the cement industry is uniquely exposed to leakage and the impact of CARB's proposed allocation rate on the California cement industry. Second, after reviewing the applicable statutory requirements, these comments address proposed additional policies and measures, including (a) why any additional regulations to reduce GHG emissions will increase the risk of leakage in the cement sector; (b) why any additional GHG regulations to reduce co-pollutants will increase the risk of leakage in the cement sector; (c) why CARB should identify a BCA as a necessary additional action to minimize leakage in the cement sector; and (d) why the removal of artificial barriers could contribute to GHG emissions reductions for the cement industry. Finally, CSCME requests that CARB enhance the transparency of its regulatory development process by engaging stakeholders earlier in the development and use of future studies.

I. CARB'S PROPOSED ALLOCATION FRAMEWORK THREATENS THE SURVIVAL OF THE CEMENT INDUSTRY IN CALIFORNIA

1. The California Cement Industry Is Uniquely Exposed to Leakage

CARB's statutory requirement to minimize leakage is particularly important for the California cement industry, which is at an extreme risk of leakage in both absolute and relative terms.[2] The cement industry's risk of leakage is based on a confluence of factors, including but not limited to:

- **High Exposure to Compliance Costs:** Given the very high GHG intensity of the cement industry, California cement producers' exposure to compliance costs is extraordinarily high.[3] In fact, according to CARB's own analysis that was used to support the current allowance allocation framework, the cement industry has a GHG intensity that is more than three times greater than that of the next most emissions-intensive industry.[4]

- **Low Ability to Reduce Exposure to Compliance Costs:** The availability of technologically feasible and cost-effective abatement opportunities in the California cement industry is limited by a variety of factors, including practical inability to substitute lower carbon fuels and the strong incentives cement producers already have to use the most advanced and energy efficient production technology. The dominant constraint on abatement is the fact that a majority of the cement

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[2] *See* CSCME, "Comments Related to the Risk of Leakage in the Cement Sector" and Appendix, March 10, 2016, attached to CSCME, "Comments on May 18, 2016 Public Workshop on Emissions Leakage Potential Studies," June 10, 2016, at Attachment 1.

[3] *See, e.g.,* CSCME, "Comments Related to the Risk of Leakage in the Cement Sector," March 10, 2016, at 3.

[4] *See* CSCME, "Comments on Draft Regulation and Initial Statement of Reasons," September 19, 2016, at 4.

industry's direct GHG emissions are process emissions, which are an unalterable consequence of the chemical process required to convert limestone into cement clinker.[5]

- **Limited Ability to Pass Through Realized Compliance Costs:** Because cement is a highly interchangeable product, cement producers compete almost exclusively on the basis of price, and even small differences in price are sufficient to induce customers to buy cement at the lowest price (whether from domestic or foreign sources). Given the high level of competition in the California cement market, cement producers cannot pass through realized compliance costs to customers by increasing prices without suffering a loss of market share or profitability.[6]

2. CARB's Proposed Allowance Allocation Rate Threatens The Viability Of The California Cement Industry

Under the Scoping Plan's Proposed Scenario, CARB's primary means for minimizing leakage in the manufacturing sector is the allocation of allowances to at-risk industries. CARB's proposed allocation framework, however, is a significant departure from its current approach and would result in substantially lower allowance allocation rates for virtually every industry, including cement. CSCME has commented extensively to CARB regarding the fundamental due process, legal, policy, and analytical flaws in its proposed framework, which would significantly increase the risk of leakage.

Under CARB's proposed framework, the cement industry's overall allocation rate will drop overnight from 0.757 allowances per metric ton of cement in 2020 to 0.550 in 2021. The allowance rate will continue to decline to the level at which it is significantly below the industry's process emissions by 2030. As a result, almost 40 percent of the industry's emissions will be "uncovered." Based on CARB's leakage studies and an ultra-conservative carbon price assumption, any attempt to pass through the costs of these uncovered emissions will likely result in a 63% to 79% decline in output – a decline far greater than that experienced during the bursting of the housing bubble and onset of the Great Recession.[7] Two plants, out of the ten in California, failed to survive the Great Recession.

The impact of the proposed allowance allocation framework on the California cement industry cannot be overstated. Such a massive decline in output would necessarily mean that California cement consumption will be replaced with higher GHG intensive cement sourced from abroad, causing massive leakage in violation of AB 32 and California's climate change objectives and irreversibly harming the industry, its employees, and the surrounding communities.

While CSCME strongly supports the use of allowance allocation as a tool for minimizing leakage, CSCME opposes CARB's proposed approach to revising the allowance allocation framework for the post-2020 period. If necessary revisions are made to CARB's proposed allowance allocation framework, however,

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[5] *See, e.g.,* CSCME, "Comments Related to the Risk of Leakage in the Cement Sector," March 10, 2016, at 3-5.

[6] *See, e.g., id.* at 5-11.

[7] *See* **Attachment**.

CSCME believes that CARB's proposal to continue the Cap-and-Trade Program could appropriately balance its climate change objectives with preserving the California cement industry.

II. ANY ADDITIONAL POLICIES AND MEASURES MUST COMPLY WITH CARB'S MANDATE TO CONSIDER COST-EFFECTIVENESS AND MINIMIZE LEAKAGE

1. CARB Must Comply With All Applicable Statutory Requirements In Implementing Its Climate Change Program

In implementing AB 32, CARB is required to:

> Design the regulations, including distribution of emissions allowances where appropriate, in a manner that is equitable, seeks to minimize costs and maximize the total benefits to California, and encourages early action to reduce greenhouse gas emissions.

Section 38562(b) of AB 32 also directs CARB to "[c]onsider cost-effectiveness," "[c]onsider overall societal benefits", including "benefits to the economy, environment, and public health," and "minimize leakage."

In August 2016, California enacted AB 197, which included the following provision (emphasis added):

> 38562.5. When adopting rules and regulations pursuant to this division to achieve emissions reductions beyond the statewide greenhouse gas emissions limit and to protect the state's most impacted and disadvantaged communities, the state board shall follow the requirements in subdivision (b) of Section 38562, consider the social costs of the emissions of greenhouse gases, and prioritize both of the following:
>
> (a) Emission reduction rules and regulations that result in direct emission reductions at large stationary sources of greenhouse gas emissions sources and direct emission reductions from mobile sources.
>
> (b) Emission reduction rules and regulations that result in direct emission reductions from sources other than those specified in subdivision (a).

As a threshold matter, AB 197 reiterates CARB's obligation to "follow the requirements in subdivision (b) of Section 38562," which include the requirements specified above – equitably minimize costs and maximize benefits, consider cost-effectiveness, consider overall societal benefits (including benefits to the economy), and minimize leakage. Thus, AB 197 does not permit CARB to ignore or otherwise diminish the requirements under AB 32. Rather, AB 197 simply instructs CARB to consider the social

costs of the emissions of greenhouse gases and prioritize direct emission reductions, provided doing so can be achieved consistent with the existing requirements under AB 32.

2. Any Additional Regulations To Reduce GHG Emissions Will Unduly Burden, And Increase The Risk Of Leakage In, The Cement Industry

The Scoping Plan Update states that "[w]hile GHG reductions will occur at covered entities under the current design of the Cap-and-Trade Program, CARB has begun the process to evaluate potential changes to program design features that would support greater direct GHG emissions reductions at Cap-and-Trade Program covered entities."[8] One area of evaluation that CARB discusses will be "[r]edesigning the allocation strategy to reduce free allocation at a rate to support increased technology and energy investment at covered entities to reduce GHG emissions."[9]

The implicit assumption in the above statement is that increasing costs (*i.e.*, reducing allowance allocations) will actually increase investment in California. Although this may be true for some industries, it is patently false for any industry that is highly exposed to leakage, as the increased costs will place such an industry at a severe disadvantage to out-of-state competitors that will not face a similar burden. As such, CARB's evaluation of potential changes to the design features of the cap-and-trade program should differentiate industry treatment according to leakage risk.

The Scoping Plan Update provides a useful framework for thinking about additional regulations to reduce GHG emissions in the industrial sector. Specifically, it states that, "[t]hree predominant in-State paths to reducing GHG emissions for the Industrial sector are: fuel switching, energy efficiency improvements, or the relocation of production to outside the State."[10] Due to significant technology and policy constraints, there is ample reason to believe that any direct measures applied to the cement industry will result in emissions leakage.

Fuel Switching. The cement industry's ability to substitute lower carbon fuels in the future is constrained by a mix of market, technical, and regulatory barriers. The vast majority of cement kilns in the United States, including California, currently use either coal or petroleum coke as the primary fuel. In theory, California cement manufacturers could use natural gas as a primary fuel and introduce other alternative fuels to reduce their GHG emissions: (1) scrap tires; (2) wood; and (3) engineered municipal solid waste. In practice, however, each option suffers from its own technical or regulatory barrier. Substitution toward lower-carbon fuels in a cement kiln can often come at the expense of energy and/or production efficiency, which can place an overall limit on the progress that can be made in reducing

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[8] Scoping Plan Update at 40.

[9] *Id.* (emphasis added).

[10] *Id.* at 94.

GHG emissions by switching fuels.[11] Furthermore, increased use of alternate fuels, particularly natural gas, will increase criteria air pollutants such as NO_X.[12]

Energy Efficiency Technologies. Cement producers already use, and have invested in, the most efficient technology available. All cement plants operating in California currently utilize preheater/precalciner kilns (the most energy-efficient technology available). Moreover, because cement manufacturing is a highly mature process, the prospects for large-scale breakthroughs in more energy efficient production technologies are extremely limited. Finally, given that fuel costs constitute a substantial percentage of total operating costs, cement manufacturers always have a strong economic incentive to invest in cost-effective energy efficiency improvements whenever they exist. As a result of these factors, the California cement industry's opportunities to improve its energy efficiency are exceptionally low.[13]

Leakage. Given the cement industry's unique features and the barriers that are currently in place, the only way to achieve additional GHG reductions would be for production to be relocated outside of California. Because this is clearly an undesirable outcome, CSCME cannot support CARB's efforts to redesign its allocation strategy. According to the Scoping Plan Update,

> [e]missions leakage can occur when production moves out-of-state, so there appears to be a reduction in California's emissions, but the production and emissions have just moved elsewhere. This loss in production...could potentially increase global GHG emissions if the production moves to a less efficient facility outside of California.[14]

The Scoping Plan Update also states:

> While fuel switching and energy efficiency are beneficial strategies, relocation of production to outside the State is disadvantageous for a couple of reasons. First, AB 32 requires the State's climate policies to minimize emissions leakage, and relocation would shift GHG emissions outside of the State, resulting in emissions leakage. Second, it could also reduce the availability of associated jobs and could impact a local tax base that supports local services such as public transportation, emergency response, and social services, as well as funding sources

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[11] *See, e.g.,* CSCME, "Comments Related to the Risk of Leakage in the Cement Sector," March 10, 2016, at 4-5.

[12] *See, e.g.,* U.S. Environmental Protection Agency, Alternative Control Techniques Document Update: NO_x emissions from New Cement Kilns, EPA-453/R-07-006 (2007), at 27, 34 ("When fired in the main kiln burner, natural gas has been shown to generate approximately twice the amount of NO_x per ton of clinker as coal or oil;" "[u]sing coal instead of natural gas results in lower uncontrolled NO_x emissions").

[13] *See, e.g.,* CSCME, "Comments Related to the Risk of Leakage in the Cement Sector," March 10, 2016, at 4.

[14] Scoping Plan Update at 45-46.

> critical to protecting the natural environment and keeping it available for current and future generations.[15]

Finally, CARB also acknowledges the cement industry's unique constraints in achieving further emissions reductions when it states, "policies and measures to supply cleaner fuels and more efficient technology are the key to reducing GHG emissions. Some sectors, such as cement and glass, also have significant process emissions, and there may be fewer opportunities to address those process emissions, as they are related to chemical reactions and processes to meet safety, product-specific, or regulatory standards for the final products."[16]

In short, due to significant and unique policy and technological constraints, withholding allowances from the cement industry to incentivize fuel switching or the adoption of certain energy efficiency technologies would have the opposite of CARB's intended effect and would result in systematic disinvestment and leakage.

3. Any Additional Regulations To Reduce GHG Co-Pollutants Will Unduly Burden, And Increase The Risk Of Leakage In, The Cement Industry

In the Scoping Plan Update, CARB also highlights recommendations to pursue more facility-specific GHG reduction measures to achieve potential local air quality co-benefits.[17] Such an approach is misguided. Because the California cement industry is already subject to onerous direct regulations intended to control and reduce direct emissions of criteria and toxic air pollutants, any additional measures would be duplicative and less effective.

The Scoping Plan Update also mentions that "[r]educing allocation if the covered entity increases criteria or toxics emissions over some baseline" will be another potential change to evaluate in support of greater direct GHG emissions reductions.[18] California, however, already regulates toxic pollutants under other legal regimes, as noted in the Scoping Plan Update:

> The State has a long history of addressing health-based air pollutants in this sector. Many of the actions for addressing criteria pollutants and toxic air contaminants in the industrial sector are driven by California's local air district stationary source requirements to ensure progress toward achieving State and national ambient air quality standards.[19]

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[15] *Id.* at 94.

[16] *Id.* at 93 (emphasis added).

[17] *Id.* at 96.

[18] *Id.* at 40.

[19] *Id.* at 94.

Moreover, CARB expressly recognizes that "GHG, criteria pollutant, and toxic air contaminant trends are not always correlated."[20] The introduction of such a "baseline" calculation into the allocation framework would lead to incoherent results, where a facility may be in compliance with California's legal requirements directly addressing these pollutants even if they are above any new and different "baseline" contemplated by the Scoping Plan Update. Such a measure would be inefficient, because it would attempt to address local pollutants through a program directed at global pollutants, and it would have significant unintended consequences, including unnecessary and duplicative costs and compliance difficulties for the California cement industry.

4. CARB Should Expressly Identify A BCA As A Necessary Additional Action To Minimize Leakage In The Cement Sector

In the Scoping Plan Update, CARB lists several "Potential Additional Actions" that it could take to complement its existing measures and policies and further reduce GHG emissions.[21] CARB anticipates "that there will be workshops and other stakeholder forums in the years following finalization of the Scoping Plan to explore these potential actions."[22] The potential additional actions include the following: "[e]valuate and design additional mechanisms to further minimize emissions leakage in the Cap-and-Trade Program."[23]

When considering additional actions, CSCME urges CARB to establish a BCA to minimize leakage in the cement sector. In December 2010, CARB directed its staff to consider a border adjustment for cement to address the additional risk of leakage associated with the existing allowance allocation approach.[24] Unfortunately, CARB has not developed a BCA to address the increasing risk of leakage to the California cement industry and is now proposing fundamental changes to the allowance allocation framework.

A well-designed and adequate allowance allocation framework has the potential to minimize both the risk of leakage relative to imported cement (*i.e.*, intra-industry leakage) and relative to imported substitutes for concrete, such as asphalt or steel (*i.e.*, inter-industry leakage). Even if the cement industry is assigned the highest assistance factor possible, however, the risk of both intra-industry and inter-industry leakage will rise as the cap adjustment factor declines over time. Given this feature of the program, an incremental BCA has the potential to minimize the risk of intra-industry leakage by placing a similar "net" compliance obligation on imported cement (*i.e.*, importers incur an obligation for any GHG emissions that exceed the allowance allocation rate for California producers). In short, an incremental BCA can serve as an important and necessary complement to the allowance allocation framework, especially in the context of a rapidly declining cap adjustment factor and, therefore, allocation rate.

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[20] Scoping Plan Update at 96.

[21] *Id.*

[22] *Id.*

[23] *Id.* at 97.

[24] CARB Resolution 10-42, December 16, 2010.

In order to prevent emissions leakage and achieve California's climate change objectives, all cement sold in California should face comparable compliance obligations under AB 32. Implementation of an effective BCA for cement is instrumental in achieving this goal, and CARB should explicitly identify a BCA as a potential additional action to minimize leakage in the cement sector.

5. CSCME Supports The Removal Of Artificial Barriers To Further GHG Emissions Reduction In The Cement Industry

In addition to considering a BCA, CSCME recommends that CARB remove artificial barriers to further GHG emissions reductions in the cement industry, including but not limited to barriers regarding limestone blending and the use of alternative fuels. As mentioned above, the California cement industry has an exceptionally low ability to reduce its GHG intensity largely due to the fact that more than half of the industry's GHG footprint is associated with process emissions. This is further compounded by the fact that existing plants already utilize the most advanced and energy efficient production technology and are constrained in their ability to substitute lower carbon fuels in the future due to market, technical, and regulatory barriers. Reducing these barriers would allow for additional GHG emissions reduction in the industry.

Artificial barriers in limestone blending are particularly problematic for the cement industry. In other countries, cement and concrete codes and standards permit a higher percentage of limestone blending, which decreases the GHG emissions per ton of cement by the corresponding increase in the percentage of limestone. In California, however, as a result of differing codes and standards, the commercial reality is that blending of limestone is limited to 5 percent. Like these other countries, California state agencies and local governments should recognize that a higher limestone blending percentage (up to 15 percent) can be used for a wide variety of cement and concrete end-uses and should implement/harmonize standards and codes that permit such higher blending in appropriate applications.

In addition, reducing the barriers associated with alternative fuels could allow the cement industry to further reduce its emissions. In California and the United States more generally, the vast majority of cement kilns currently use either coal or petroleum coke as the primary fuel. In theory, California cement manufacturers could use a wide range of alternative fuels to reduce their GHG emissions, such as engineered municipal solid waste. However, engineered municipal solid waste faces its own barrier due to regulatory limits on how much of the fuel can be used. In addition, negative public perceptions associated with the use of solid waste and other alternative fuels often cause problems during the permitting process.

Given the cement industry's high level of process emissions and already advanced energy efficient production technology, the removal of the industry's artificial barriers is crucial to further reductions in GHG emissions in the cement sector.

III. CSCME ENCOURAGES CARB TO ENGAGE STAKEHOLDERS IN FUTURE STUDIES

The Scoping Plan Update mentions that an "economic analysis will be revised prior to the final release of the 2030 Target Scoping Plan to include additional analyses including a regional impact analysis to

estimate the distribution of economic impacts across regions of the State, including disadvantaged communities."[25] The Scoping Plan Update also mentions multiple studies underway to assess the impact of California's climate change policy and AB 32, including "three research contracts underway at CARB to quantify the impact of California's climate policy on regions and disadvantaged communities throughout California," "researchers from UCLA [who] are estimating the improvements in health outcomes associated with AB 32," and "two studies currently underway to quantify the impact" of the Greenhouse Gas Reduction Fund.[26]

Given the importance of understanding the impact of cap-and-trade and the proposed allocation framework, CSCME encourages CARB to: (1) engage industry stakeholders early in the process to ensure that the studies are utilizing the best data available and reflect the unique circumstances of each industry and (2) provide stakeholders with sufficient time to review and comment on the studies.

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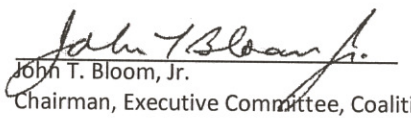
CSCME looks forward to continuing to work with CARB to achieve California's climate change objectives while minimizing leakage in the cement sector so that California cement manufacturers can continue to be valuable contributors to climate change solutions.

Sincerely yours,



John T. Bloom, Jr.
Chairman, Executive Committee, Coalition for Sustainable Cement Manufacturing & Environment

CC: Steven Cliff, California Air Resources Board
Richard Corey, California Air Resources Board
Rajinder Sahota, California Air Resources Board
Jason Gray, California Air Resources Board
Mary Jane Coombs, California Air Resources Board
Derek Nixon, California Air Resources Board

[25] Scoping Plan Update at 75.

[26] *Id.* at 75-76.

Impact of Alternative Scenario: Why CARB's Proposed Framework Fails to Minimize Leakage in the Cement Industry

What does the proposed framework mean in terms of decreases to the California cement industry's allowance allocation rate?

- CARB is proposing to decrease the cement industry's assistance factor (AF) from 1.00 to 0.74.
- When this AF is combined with the existing benchmark and a cap adjustment factor consistent with the proposed regulation, the cement industry's allocation rate will precipitously decline from 0.757 allowances per metric ton of cement in 2020 to 0.550 in 2021.
- The allocation rate will continue to decline until 2030, reaching 0.457 allowances per metric ton — a level that is significantly below the process emissions wall.

How will this decrease in the allocation rate affect the California cement industry's "uncovered" carbon costs?

- For the sake of illustrating the potential impacts of the proposed framework, we assume the following conditions exist in 2026 (i.e., the midpoint of the post-2020 timeframe):
  - The prevailing carbon price will increase to $20.00, which is an ultra-conservative assumption given that CARB expects the auction reserve price to be $20.70 in that year.
  - The cement industry's allocation rate declines to 0.498, as implied by the current proposal.
  - The cement industry's average GHG intensity decline to 0.80 metric tons of GHG per metric ton of cement (i.e., appreciably below the industry "best performer" prior to the start of the program).
- Under these assumptions, approximately 62% of the cement industry's carbon costs will be offset by allowance allocation and the remaining 38% will remain "uncovered."
- This suggests that, given a carbon price of $20, the cement industry's net exposure will be $7.55 per metric ton of cement.

What will happen if the California cement industry attempts to pass through these "uncovered" carbon costs to consumers?

- According to the leakage studies commissioned by CARB and used as the basis for the proposed allowance allocation framework, each $1.00 in uncovered compliance costs per unit of output will reduce California cement production between 8.4% and 10.5%.[1]
- Therefore, even under an ultra-conservative carbon price assumption, the studies suggest that the California cement industry will experience a 63% to 79% decline in output if it attempts to pass through $7.55 in uncovered compliance costs to customers — a decline that would easily exceed the historic downturn in the cement industry during the Great Recession.

[1] See Table 1 for detailed calculations.

How does such a swift and severe decline in domestic output not result in leakage?

- Neither CARB staff nor the commissioned studies offer a clear rationale for how this reduction in domestic production does not result in severe emissions leakage.
- The domestic leakage study does not attempt to estimate the proportion of lost domestic production that is offset by an increase in output in other U.S. state.
- The international leakage study attempts to estimate the portion of the lost domestic production that will be offset by an increase in international output using a post-hoc calculation (i.e., the "international market transfer rate"). In the case of the California cement industry, the IMT suggests that only a small fraction (4%) of the production decline will be offset by an increase in international output. The study offers no logical explanation as to what happens to the other 96% of the production decline (i.e. how will California's demand for cement be met if not by out-of-state producers?).

What does all of this mean in terms of global GHG emissions?

- It is unclear. Neither CARB staff nor the commissioned studies offer clear guidance on the potential impact on global GHG emissions.
- Neither study estimates the GHG intensity of imported product, including the increased GHG emissions associated with transporting imported product to the California market. CARB staff has not offered any analysis to fill this critical gap.
- As a result, CARB is incapable of establishing that the proposed AFs minimize leakage or, alternatively, that reducing the AF for the California cement industry will result in a global GHG benefit.

How should CARB proceed?

- CARB should take the time to conduct a careful and critical evaluation of its proposed allowance allocation framework, including the practical impact (e.g., output loss) on the California cement industry due to adjustments to benchmarks, assistance factors, and CAFs.
- CARB should not reduce the cement industry's AF because there is no credible evidence that a lower allocation rate is consistent with the requirement to minimize leakage, because the evidence on which CARB does rely unequivocally demonstrates that significant leakage will occur under its proposed framework, and because the decline in the statewide emissions cap will ensure that California meets its GHG reduction goals (regardless of allowance allocation).
- To the extent that CARB adopts an AF of less than 1.0 for the cement industry, it should also adopt an incremental border adjustment that imposes comparable requirements on cement importers, which is the only approach to ensure the minimization of leakage in the absence of 100% allowance allocations.

Table 1. Proposed Framework: Estimated Output Declines

Metric	Dom. Study	Int'l. Study
Estimated Output Decline from Combustion Emissions (Per the Leakage Studies)	20.5%	33.0%
Carbon Price Assumption (Per the Leakage Studies)	$24.88	$10.00
Process Emission Share Assumption (Per CARB's MRR Data, as Reported in Table 1 of Attachment B)	60.7%	60.7%
Estimated Output Decline per $1 of Uncovered Carbon Costs (Combustion + Process Emissions)	2.1%	8.4%
Uncovered Carbon Costs @ $20 Carbon Price in 2026 (Per Prior Slide)	$7.55	$7.55
Estimated Output Decline Under Proposed Framework	15.8%	63.4%
Output Decline if Factors are Non-Additive	**63.4%**	
Output Decline if Factors are Additive	**79.2%**	

Why CARB's Proposed Approach Will Severely Exacerbate Emissions Leakage in the California Cement Industry

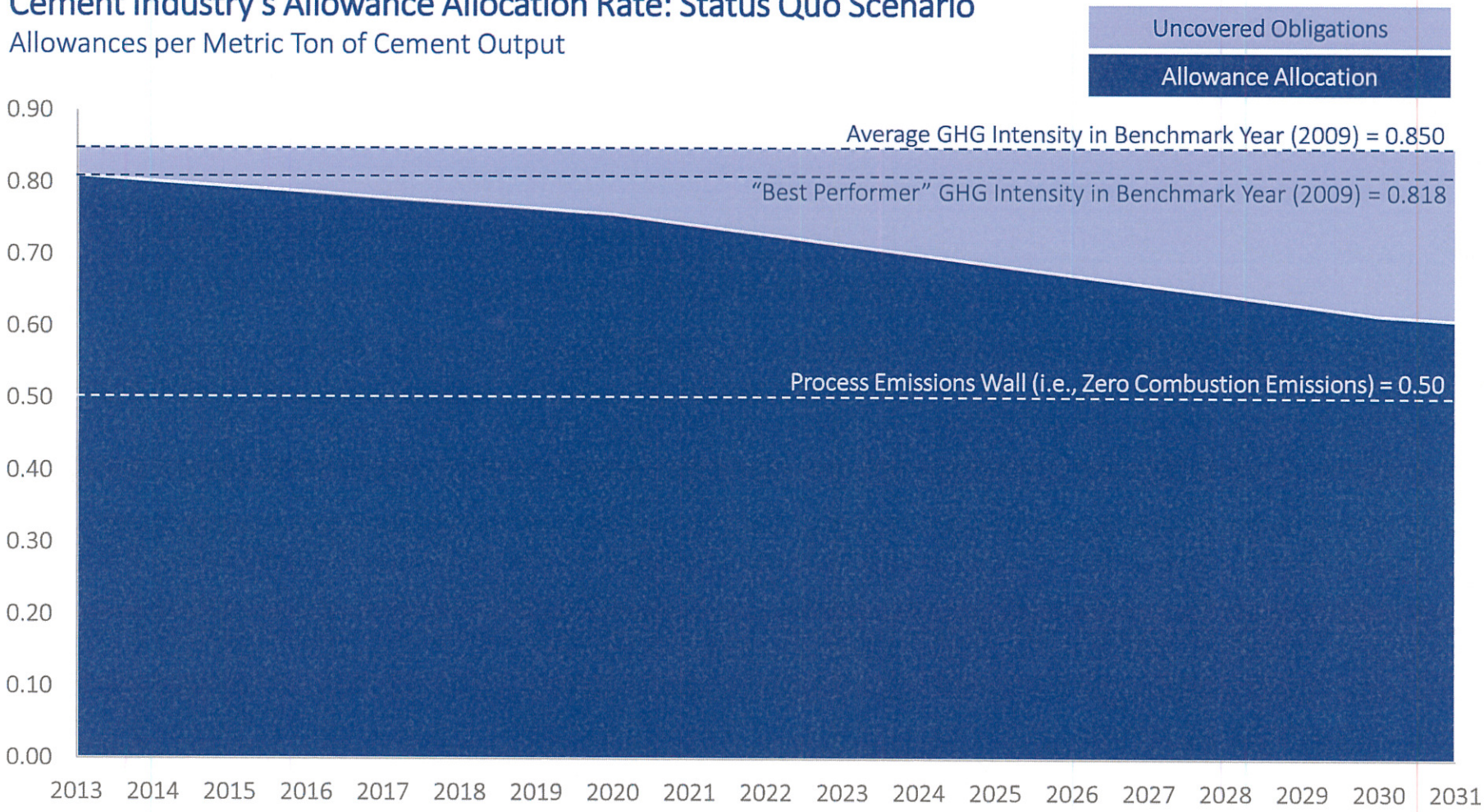
PREPARED BY CSCME

02.24.17

Under a "status quo" scenario, the cement industry's allocation rate would decline to 0.62 allowances per MT of cement by 2030.

Cement Industry's Allowance Allocation Rate: Status Quo Scenario

Allowances per Metric Ton of Cement Output



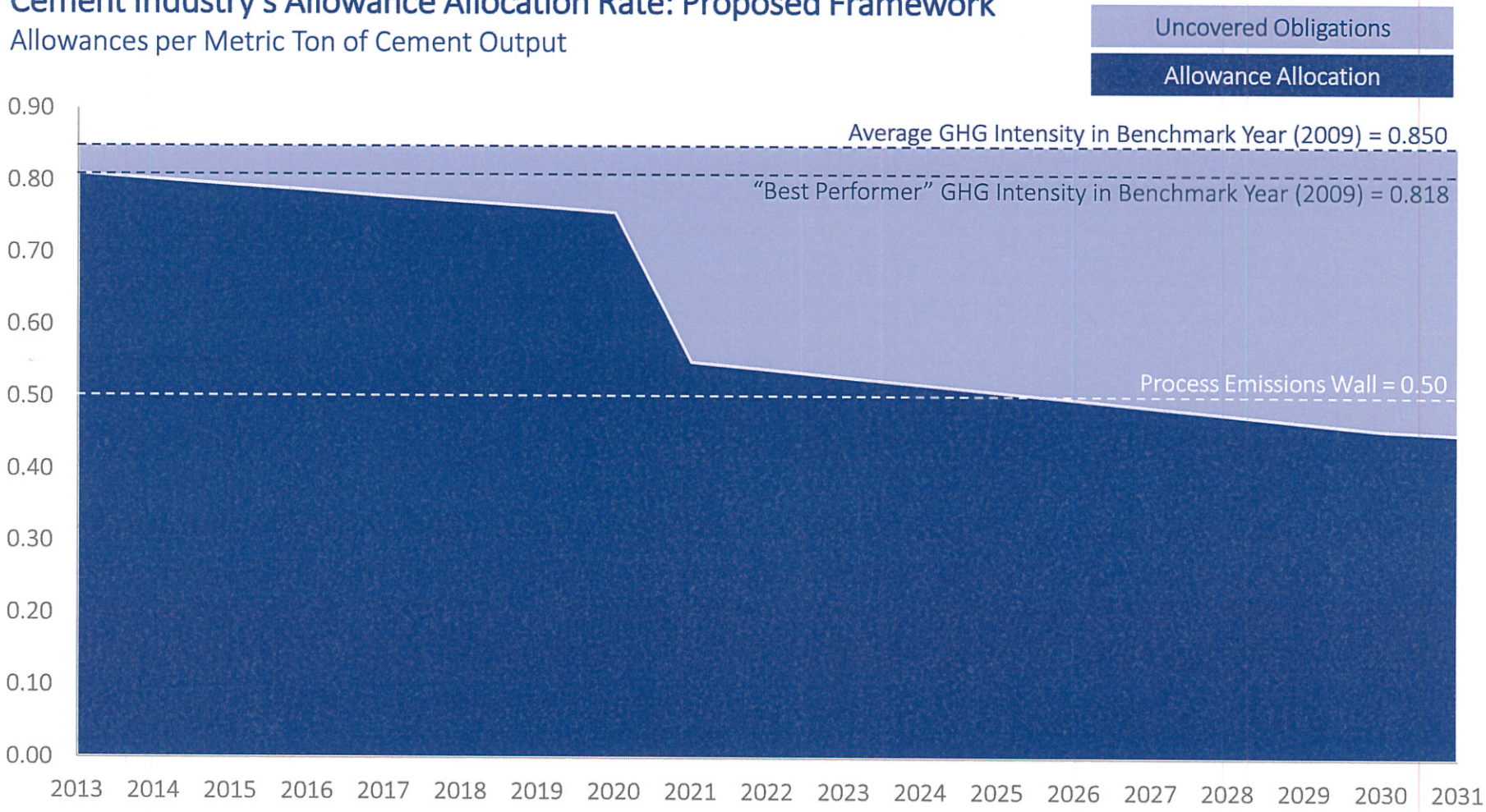
Note: The status quo scenario assumes that the benchmark and assistance factor remain unchanged but the cap adjustment factor is modified to be consistent with the more aggressive decline in the overall program cap (see Table 9-2 of the proposed modifications).

Source: CARB (Mar 2011). Final Regulation Order. Pg. 145 & Pg. 161; CARB (2016). Proposed Amendments, Attachment A. Pg. 214.

Under CARB's proposed framework, the industry's allocation rate would decline to 0.46 allowances per MT of cement — well below the "process emissions wall."

Cement Industry's Allowance Allocation Rate: Proposed Framework

Allowances per Metric Ton of Cement Output



Note: The status quo scenario assumes that the benchmark and assistance factor remain unchanged but the cap adjustment factor is modified to be consistent with the more aggressive decline in the overall program cap (see Table 9-2 of the proposed modifications).

Source: CARB (Mar 2011). Final Regulation Order. Pg. 145 & Pg. 161; CARB (2016). Proposed Amendments, Attachment A. Pg. 214.

Given conservative assumptions, the cement industry will face an "uncovered carbon cost" of $7.55 per MT of GHG in 2026 under the proposed framework.

Proposed Framework: The Cement Industry's "Uncovered" Carbon Costs in 2026

Note: The calculation assumes that in 2026 (midpoint of post-2020 timeframe) there is a prevailing carbon price of $20, the industry's allocation rate is 0.498, and the cement industry's average GHG intensity is 0.80 metric tons of GHG per metric of cement.

Source: CARB (2011) Final Regulation Order; CARB (2016), "Post-2020 Industry Assistance Factor Calculations."

The leakage studies suggest that passing through an uncovered carbon cost of just $7.55 to customers will result in a 63% to 79% decline in industry output.

Proposed Framework: Estimated Output Declines

Metric	Domestic Study	Int'l Study
Estimated Output Decline from Combustion Emissions (Per the Leakage Studies)	20.5%	33.0%
Carbon Price Assumption (Per the Leakage Studies)	$24.88	$10.00
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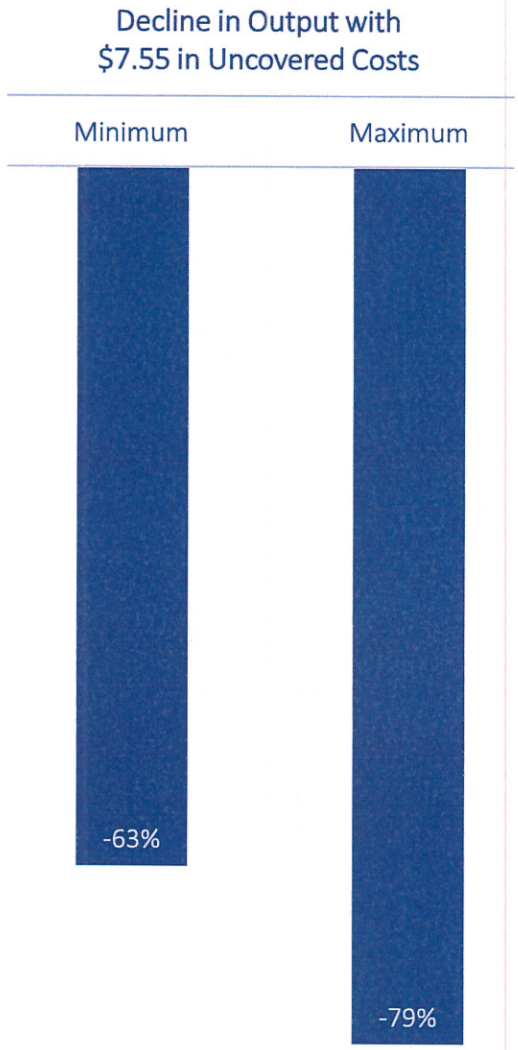
Estimated Output Decline Under Proposed Framework	15.8%	63.4%
Output Decline if Factors are Non-Additive	**63.4%**	
Output Decline if Factors are Additive	**79.2%**	

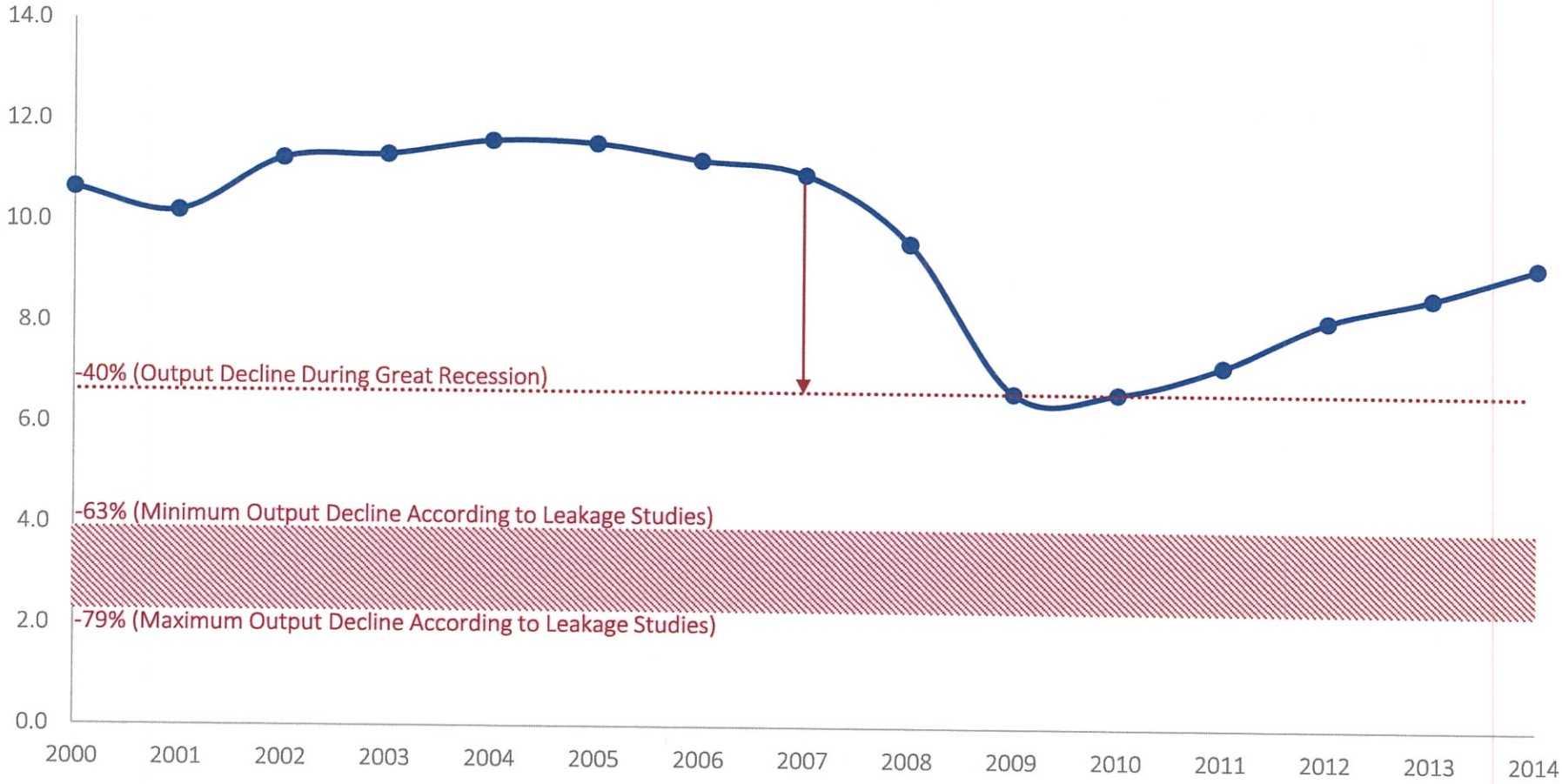


Source: CARB (2016), "Post-2020 Industry Assistance Factor Calculations"; Fowlie et al. (2016), "Market Based Emissions Regulation and Industry Dynamics"; Resources for the Future (2016), "Employment and Output Leakage under California's Cap-and-Trade-Program."

To put this scenario into perspective, such an output decline would far exceed the cement industry's unprecedented downturn during the Great Recession.

Proposed Framework: Estimated Output Declines in Context

California Cement Industry Output, Million Tons of Clinker Produced



Source: Replicated from Figure 13 of California Air Resources Board (2016). California GHG Emissions Inventory. Page 7; 2014 data taken from U.S. Geological Survey, Mineral Industry Surveys.

Neither CARB nor the studies offer a clear explanation for how such a reduction in output will not result in severe injury and irreversible emissions leakage.

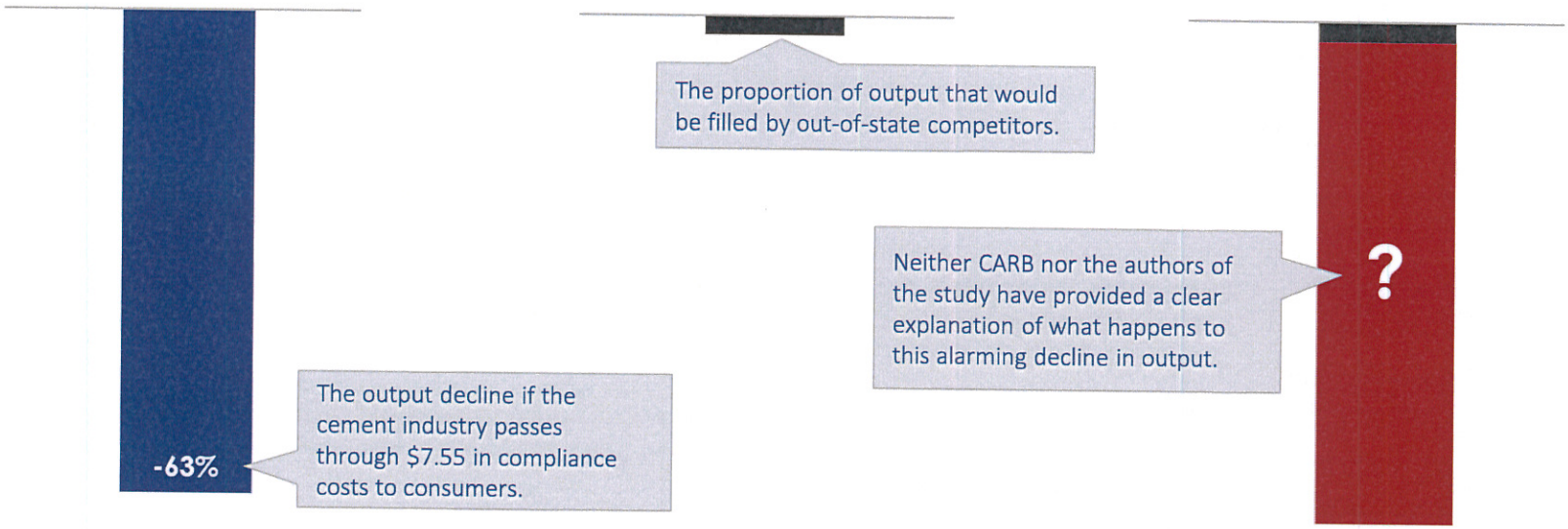
Why CARB's Proposed Framework Lacks Credibility

California Cement Industry Output, Millions Tons of Clinker Produced

The results of the International Leakage Study suggest that an uncovered carbon cost of $7.55 per MT of GHG will result in a 63% decline in output...

...but the International Leakage Study's IMT suggests that only a tiny fraction of the cement industry's output loss will be transferred to out-of-state competitors...

...and neither the study's authors nor CARB staff has offered a reasonable explanation for what fills the void created by a massive decline in California cement production.



Additionally, there are several reasons to believe that the studies systematically underestimate the risk of economic and emissions leakage under AB 32.

1 Process Emissions

The leakage studies explicitly do not model the impact of process emissions, and CARB's adjustments for process emissions do not address the original output metrics. As a result, the estimated output decline and risk of emissions leakage for process emissions-intensive industries are likely to be significantly understated.

2 Inter-Industry Leakage

Neither leakage study evaluates the potential for shifts in production to different out-of-state industries (e.g., California cement production shifts to out-of-state asphalt). To the extent that this occurs and that these substitute products are transported to California for consumption, the modeling results are likely to understate to risk of emissions leakage.

3 Emissions Intensity Differentials

Neither study takes the final step of translating estimates of "production leakage" into "emissions leakage". Given that most products manufactured in California are likely to have a lower emissions footprint and require less transportation than those produced outside, emissions leakage is likely to be significantly higher than production leakage.

4 Other Costs Associated with AB 32

The leakage studies only consider the direct compliance costs associated with the cap-and-trade program when estimating output impacts. In reality, AB 32 imposes a range of other costs on industries – including the RPS, LCFS, administrative fees, and compliance activities. These costs will increase the financial burden associated with AB 32, increasing the potential for output decline and the risk of emission leakage.

How should CARB proceed?

High Priority Recommendations

- CARB should take the time to conduct a careful and critical evaluation of its proposed allowance allocation framework, including the practical impact (e.g., output loss) on California industries due to adjustments to benchmarks, assistance factors, and cap adjustment factors.

- CARB should not reduce the cement industry's AF because there is no credible evidence that a lower allocation rate is consistent with the requirement to minimize leakage, because the evidence on which CARB does rely unequivocally demonstrates that significant leakage will occur under its proposed framework, and because the decline in the statewide emissions cap will ensure that California meets its GHG reduction goals (regardless of allowance allocation).

- To the extent that CARB adopts an AF of less than 1.0 for the cement industry, it should also adopt an incremental border adjustment that imposes comparable requirements on cement importers, which is the only method to ensure the minimization of leakage in the absence of 100% allowance allocation.