

California Air Resources Board

December 8, 2025

Attn:

Pamela Gupta, Branch Chief, Building Decarbonization

Liang Liu, Manager, Building Embodied Carbon Policy Section

Lex Mitchell, Manager, Building Embodied Carbon Analysis Section

Letter of Public Comment on the October 30th Embodied Carbon Workshop proposals

Dear Ms. Gupta, Ms. Liu, and Mr. Mitchell,

On behalf of the Carbon Leadership Forum (CLF), we write to offer comments for your consideration in the development of programs under CA Health & Safety Code § 38561.3 (2024). CLF is highly supportive of CARB's program efforts and commends CARB staff for developing a comprehensive program that will be strengthened by stakeholder input. We look forward to continued engagement in CARB's process.

Manufacturer Reporting

Overview

We are very encouraged by the direction CARB is heading with its proposed manufacturer reporting requirements. In particular, we are pleased to see "CARB-approved EPDs" added as a Method 1 manufacturer reporting pathway and think this is a major step forward to align with the legislation and the current state of the market.

Our comments emphasize how CARB may better align the proposed manufacturer reporting requirements with CA Health & Safety Code § 38561.3 (2024). In particular, part (C)(2) states:

"A requirement for the submission by the manufacturer of a building material of an Environmental Product Declaration, Type III, as defined by the International Organization for Standardization (ISO) Standard 14025, or similarly robust material life-cycle assessment approaches that have uniform standards in data collection consistent with ISO Standard 14025, industry acceptance, and integrity for construction materials used for the building."

We encourage CARB to take a broader view of how their program can help complement and advance EPD data quality by adding additional criteria on PCR-compliant EPDs, rather than requiring a completely new calculation method for EPDs. The current requirements primarily take the calculation method established in Method 2 and apply it to Method 1, proposing significant changes to current LCA/EPD practices that may not align with **"industry acceptance and integrity"** from the legislation. We believe CARB's program can be a complementary catalyst to help improve the LCA ecosystem while still maintaining a regulatory program that achieves real and verifiable GHG reductions.

We believe that the manufacturer reporting and future reduction targets are important pieces of CARB’s program to reduce embodied carbon. Requiring building product reporting – as currently required by CARB’s Method 1 – and including building products in future reduction-focused regulations provides unique opportunities for greenhouse gas reduction, such as:

- Enabling lower carbon product availability to the broader market — not just those projects covered by the reporting regulation
- Allowing regulation of the “lifecycle” of building products and buildings, which broadens the suite (and maximum potential) of reduction solutions. This is especially true within the supply chain, which is not currently covered by other CARB GHG regulatory programs
- Provides an opportunity for regulating the embodied carbon of imported building products – such as through a carbon border adjustment mechanism or Low Carbon Product standard – which is not currently covered by other CARB regulations.

Data Sources

CLF believes that better aligning CARB’s reporting requirements with current market practices, while making incremental changes to improve EPDs as regulatory compliance disclosures, would better align with the “*industry acceptance*” criteria of the legislation. For this reason, CLF does not recommend using EEIO impact factors as default data for scope 2 and scope 3 emissions in Method 1: CARB-approved EPDs. **Instead, CLF recommends the following process for prescribing data sources:**

1. CARB should specify publicly available process-based LCI datasets for electricity, fuels, and transport.
 - a. A recent [NIST report](#) (Ranganath et al, 2025) shows alignment in prescribed datasets among numerous covered products and demonstrates that publicly available datasets are available and can be specified for consistency across all product categories.
 - b. Prescribing public LCI datasets allows for consistent impact factors across all product categories, requires fewer PCR updates, and invests CARB in contributing to maintaining these critical public datasets.
 - c. CLF acknowledges that CARB has proposed using fuel emissions factors that match its MRR program. This slight deviation from existing fuel LCIs was determined to be very minor (less than 1% difference when testing a cement product) and easy to implement into existing LCIs. CLF understands CARB’s rationale for aligning these factors with their other regulatory programs and doesn’t believe this will incur significant effort or expense for manufacturers.
2. CARB should prioritize facility- and product-specific EPDs as upstream supply chain inputs.
 - a. The current requirements disincentivize responsible sourcing of key upstream ingredients and work against industry efforts to increase the accuracy of EPDs.
 - b. Prioritizing specific upstream data provides an opportunity to reward companies for investing in California suppliers that are also investing in better manufacturing.
3. When upstream EPDs are not available, CARB should specify the use of all default process-based LCI datasets prescribed by PCRs.
 - a. This aligns with existing LCA practices, requires fewer PCR updates, and aligns with the traditional upstream material quantity data collected during the EPD development.

4. When existing PCRs do not prescribe upstream data, CARB should prescribe the use of “translated” EEIO factors, as outlined in this [EEIO guidance document](#). These “[bridge processes](#)” published on the US Federal LCA commons are examples of utilizing this method.
 - a. CARB (or entities required to report) can create process-based LCIs directly from the default EEIO factors supplied by CARB. As long as a purchase price per unit quantity is known (or estimated), the EEIO factors can be translated to LCIs once the upstream product is matched with the appropriate EEIO category.
 - b. Converting EEIO factors to LCI data would better align with existing **industry-accepted** practices and reduce the burden of collecting cost data for all upstream material purchases.

Generally, the 4 steps outlined above are intended to reduce dependence on EEIO factors over time and increase the focus on existing industry data collection and LCA practices.

We believe this approach to data sources better aligns with **ISO 14025, industry acceptance, and integrity** criteria for the following reasons:

- Matches the current industry approach to use process-based LCA data for EPD development (we are unaware of any PCRs or EPDs that allow or have used EEIO impact factors)
- Allows consistent data sources for electricity, fuels, and transport across all covered products
- Allows for a consistent approach to filling data gaps where data sources are not prescribed by using a translated LCI dataset based on CARB’s originally proposed EEIO default factors
- Allows CARB to benchmark product impacts with prescribed data as a reference for future reduction scenarios
- Enables support for publicly available datasets, which CARB has stated support for and is also supported by EPA’s PCR criteria and ACLCA’s PCR Standard Version 2.0
- Allows for fewer PCR updates (less time/less cost) while also creating more alignment and consistency for data sources across covered products
- Is less expensive for manufacturers since there will be less need (if any) for supply chain input cost data, which is currently outside of the scope of data collection for existing EPDs.

Finally, using EEIO data will not allow for **differentiation between different suppliers of the same input material**, which is a significant limitation of CARB’s proposed approach. Supply chain impacts are significant for many of CARB’s covered products. Reporting should therefore capture carbon reductions (and emissions) from switching suppliers. Supply chain transparency and engagement have been demonstrated as effective in reducing embodied carbon. Without differentiation between suppliers, CARB also risks encouraging the use of imports that are higher emissions than California-based suppliers that are complying with local regulations.

As we think forward to the future reduction strategies developed by 2028, we encourage CARB to plan for and allow manufacturers a broad suite of carbon reduction strategies - including switching to lower carbon suppliers.

Phasing in Method 1 by 2030

If the approach for selecting data sources CLF suggested is followed, we believe a 2030 transition date to Method 1 (as described in the proposed reporting) is feasible and preferred. Phasing should be written into the rulemaking to provide a clear signal for manufacturers moving forward. In the meantime, Method 2 requires

collection of material, energy, and fuel quantities, which is the first step to conducting a product-level LCA. This reporting can help manufacturers set up for future EPD development in 2030 and beyond.

Verification

CARB stated that they intend for their criteria to be adopted by PCRs which would allow 3rd party verification of the CARB-specific PCR criteria. Depending on the extent of CARB's final "CARB-approved EPD" criteria, this will likely increase the verification cost and/or impact the time it takes to verify an EPD. The industry currently faces some bottlenecks in EPD verification and needs to grow the number of qualified EPD verifiers to keep up with the growing demand for verified EPDs. We believe CARB has supported verification training in other regulatory programs and would recommend future support for verification training as part of the embodied carbon program. We also encourage CARB to help support PCR committees through direct participation and/or funding to integrate CARB's requirements.

Allocation of co-products

CARB proposed that each EPD show results using physical and economic allocation of co-products. The vast majority of PCRs in North America follow mass-based allocation for co-products, which aligns with ISO 21930. CARB's proposed approach is a significant departure from current practice, requires additional data collection for manufacturers, and could increase EPD costs. An alternative approach is that CARB does its own economic-allocation-based calculations using the reporting quantity and revenue/cost data on products and co-products/byproducts/wastes.

We believe these product types are most affected: steel (which produces slag as an output; steel EPDs treat slag as a co-product and allocate a portion of steelmaking impacts to slag using physical partitioning); cement, concrete, and mineral wool (which use slag as an input; their EPDs typically consider slag as a waste with no burdens); wood products (where wood chips are co-products); asphalt mixtures and asphalt-based roofing and shingles (where the asphalt binder impacts depend on allocation of the petroleum refinery process).

Definition of "single product"

CARB's requirement: *"The EPD shall be a Type III environmental declaration in accordance with ISO 14025:2006 that is specific to a single product produced at a specific facility..."*

We recommend that CARB provide clarity on what CARB means by a "single product." This requirement could imply that a SKU-focused definition is required, which is not appropriate. A lumber mill might produce 40 different SKUs of lumber — each of different dimensions (2x4x8, 2x4x10, 4x4x8, etc.) and/or grades. A steel mill could potentially produce a thousand different hot-rolled section product SKUs that vary by shape and dimension. While these are technically different products, it is unnecessary to produce a separate EPD (or separate report to CARB) for each of these SKUs if their reported impacts per declared unit are the same.

We recommend referencing or building upon the [ACLCA Open Standard EPD Types addendum](#):

“Given that the distinguishing benefit of a product-specific EPD is its accuracy of environmental impact results (by avoiding product-to-product variability), an EPD may also be considered product-specific if it covers a group of similar products that share equivalent material and performance characteristics such that their environmental impacts per declared unit are sufficiently equivalent.”

Covered products

Consider adding carpet in Phase 2. Carpet is a finish material used in significant quantities, with relatively high GWP intensity per m2 ([2025 CLF Material Baselines report](#)), and is commonly replaced at high frequency. [Tilak et al. \(2022\)](#) listed carpet as the ninth-largest emitter among federal projects (Exhibit 2). Generally, we encourage including all flooring types in Phase 2 covered products. Our review of the NAICS and HS codes revealed that many flooring types are already included as covered products, but not carpet.

Who reports?

There are typically multiple steps/manufacturers in a supply chain between raw materials and what is installed on a building. For example, to produce fabricated steel hollow structural sections (HSS): a steel mill produces steel coil (which contributes the vast majority of the emissions to the final product’s total GWP); an HSS manufacturer shapes and welds coil to produce (unfabricated) HSS; a structural steel fabricator prepares the HSS for installation in a given project. The table below outlines these steps. (Similar example = flat glass > processed glass > IGU > window assembly.) CARB could potentially require reporting from any/all of these facilities/steps.

CLF recommends balancing the goal of useful data collection to inform carbon-reduction strategies and regulation against the administrative burdens to manufacturers, verifiers, and CARB staff with a more targeted approach. CARB could determine who reports by focusing on facilities at the step(s) with the highest scopes 1 and 2 emissions in a given product type’s supply chain. For example, focusing on steel mills (rather than HSS manufacturers or fabricators), and flat glass manufacturers (rather than processed glass and IGU fabricators or curtain wall providers).

Benefits: By focusing on steps that (a) have the largest direct (including electricity) emissions and (b) tend to be more concentrated with fewer total facilities, CARB would have robust primary data for the steps with the largest reduction potentials and where regulation could affect the most change, while minimizing the potential reporting-related burdens to manufacturers, verifiers, and CARB staff. This aligns with CARB’s prioritization of those direct emissions, and allows CARB to collect primary data that captures a large share of overall emissions from a relatively small set of reporters.

Such an approach may also help to reduce the risk of double-counting (since, for example, a coil EPD provides impacts from coil production; an HSS EPD includes HSS manufacture plus the upstream impacts of the coil production, and a fabricated HSS EPD includes fabrication plus the upstream impacts of both the coil production and the HSS manufacturing).

Limitations/risks: CARB would have a less complete set of primary data. For upstream products (e.g., steel coil) where a portion is destined for non-construction end uses (e.g., automotive, etc.), CARB would need a mechanism for estimating the share of production that goes to construction.

Company/ facility type	Major input	Major output	EPDs?	% contr to fab HSS GWP	HS code
Steel mill	Ore, iron, steel scrap	Steel coil	Rarely for coil; (common for other steel mill products: hot-rolled sections, plate, rebar)	~88%	7208
Hollow structural section (HSS) manufacturer	Steel coil	HSS, unfabricated	many	~5% *includes upstream transport	7306
Steel fabricator (prepares steel for a specific project)	Unfabricated HSS	Fabricated HSS	AISC industry-ave fabrication EPD; Fabricated EPDs are typically developed by manufacturers that use industry-average downstream fab impacts; few or zero fabricator-specific EPDs	~7% *includes upstream transport	7308 or 7326

Revenue thresholds

It's not clear whether the 10 million dollar annual revenue threshold is being proposed at a facility or company level. The more inclusive approach is to apply the 10 million dollar annual revenue threshold at the company level. For example, if a concrete company has 11 individual plants located in California, with each having 1 million dollars in annual revenue, that company is doing business in California valued over 10M in aggregate. If the 10 million dollar annual revenue is a determinant of a company's ability to report (larger company, more employees, more resources), then we think CARB should consider applying the 10 million dollar threshold in aggregate for all or portions of covered products. In particular, California-based concrete and asphalt facilities may be more appropriate to compare against revenue thresholds at the company instead of facility scale. If a company exceeds the 10 million dollar revenue threshold, then any company-owned facility doing business in CA would be subject to the reporting requirements.

Product Source Disclosure Requirements

It appears that most of the information required on CARB's example product source declaration are already disclosed on EPDs. Signatures of the manufacturers or importers are missing, but could potentially be added

through a PCR update for covered products. We encourage CARB to consider how combining product source disclosures into EPDs can satisfy program goals while reducing the added reporting burden for manufacturers and importers.

Alignment with ACLCA open standard v2

CARB is likely aware of ACLCA's efforts to update their PCR Open Standard to version 2. Version 2.0 is advancing international interoperability and setting the new benchmark for consistency, comparability, and confidence in product environmental information. Early meetings of the PCR open standard v2 indicate that they will build upon existing Federal guidance on these topics, such as EPA's PCR criteria.

Version 2.0—and the full suite of standards envisioned—will drive alignment across industries and government to meet the growing demand for credible, comparable environmental data, while building on Version 1 through additional standards to support product environmental information disclosure across all sectors. CARB should explore which of its efforts dovetail with ACLCA's interests to help harmonize and align efforts to improve data quality and consistency in EPDs.

Covered Projects Reporting

Overview

Carbon Leadership Forum (CLF) is thrilled at the opportunity presented by CARB's covered project requirements to shape the direction of embodied carbon reductions in California. The project-level requirements currently outlined by CARB represent a "gold standard" for embodied carbon data collection.

Given the comprehensive nature of the requirements, we have suggested opportunities to streamline reporting and focus on the areas where reporting will provide the most value to CARB while allowing the industry to upskill over time to meet these requirements. We believe that reducing the reporting burden on project teams is ideal where possible, as it will ensure CARB program's longevity and success.

Additionally, CA Health & Safety Code § 38561.3 (2024) emphasizes *"a tracking and reporting mechanism in order to facilitate the reporting of data to the state board on the carbon intensity of buildings, and that **would also allow tracking of progress toward the carbon intensity reduction targets set forth in this section.**"*

Given this, CLF's comments focus on establishing a reporting framework that would be appropriate for compliance purposes. This is the central reason for our recommendation that project reporting (both Basic and WBLCA) **be shifted to the Certificate of Occupancy stage and focused on as-built data** to provide a basis for verifying real reductions from projects.

Phasing

We want CARB's program to succeed and believe that a phase-in period with more limited requirements for Basic Reporting will increase the success of the program by allowing time for teams to upskill to meet the broader coverage, new cost and quantity reporting requirements, and scope of the reporting.

The proposed requirements will raise the percent of projects subject to embodied carbon reporting or regulation from about 3% of commercial buildings today under CALGreen to about 30% of commercial buildings, and extend the requirements to many residential projects.¹ In addition, the element-level cost and quantity breakdown data requested in Basic Reporting are not currently normal practice in the US market. In particular, the cost tracking will require construction teams to establish new tracking systems internally and with subcontractors. Last, the proposed requirements expand the typical scope of assessment to include equipment and furnishings and building services.

For these reasons, we suggest CARB consider a pared-down version of basic reporting more in line with current market readiness. In the first year or two of program implementation, CARB's basic reporting could require tracking of a more limited list of materials within a project to help teams come up to speed on these practices, while still covering the majority of impacts.

¹Jensen, A., Brenner, A., Lewis, A., Colón Adorno, A., Palmeri, J., Bukauskas, A., Esau, R., Edelson, J., and Lewis, M. (2024). Recommendations for Washington State Embodied Carbon Code Language. Washington State Code Council and Carbon Leadership Forum.

Timing

CLF recommends that CARB require a single point in time for project reporting at the ***certificate of occupancy stage***. CLF recommends reporting at certificate of occupancy as the best option to facilitate the program's ultimate goal of meeting a statewide statutory reduction requirement and due to the following benefits:

- Captures whether the project was actually constructed
- Provides actual building product quantities
- Allows for collection of supplier information (including EPDs), aligning with manufacturer reporting
- Only option that allows for collecting construction emissions (A5) data
- Trains the market to create data that can meet the needs of future verifiable reduction requirements.

If direct cooperation with local building departments to facilitate this timeline is deemed impossible, perhaps CARB could internally use permit records to develop a list of projects and then follow up annually with projects to confirm their compliance. An “as-built” approach at certificate of occupancy would also allow alignment with the timing of submission of WBLCA for LEEDv5 Reduce Embodied Carbon credit² and ILFI's Zero Carbon Certification.

CARB's current proposed reporting regulation requires covered projects to report within one year of a building permit issuance. This requirement is essentially an “as-permitted” requirement, as the vast majority of projects will NOT have completed construction within one year. The proposed requirements represent a *partially* constructed project which adds further confusion to what is required to be tracked and what can be used to verify in an audit. If CARB chooses to maintain “as-permitted” data or the 1-year post-permit, we suggest that A5 data collection must be removed from the scope, at a minimum.

CARB has noted it is “seeking feedback from stakeholders on potential for phasing in a supplemental reporting requirement to update information from the project at the issuance or application for certificate of occupancy to ensure the fidelity of reported data to the completed project.” We suggest that given the comprehensive nature of the reporting requirements, a single point of reporting is more appropriate.

Quantities data

CLF observes that the element-level quantity breakdown data currently asked for by CARB is not yet normal practice in the US market and will require some upskilling for the industry whether as-designed or as-built quantities are requested. We suggest CARB focus on **as-built quantities data**, which:

- Has more precedent globally for collecting product quantity data (during construction), though this is more common with larger owners and procurement norms outside the US
- Provides the most opportunity for verification and enforcement if used in future reduction requirements
- Aligns with our timing suggestion of certificate of occupancy

² Note that LEEDv5 permits either as-designed or as-built submissions for the Reduce Embodied Carbon credit.

We also suggest that bulk material purchases may be a more appropriate level of detail to require to align with the norms of procurement. For example, requiring reporting of the total tons of rebar purchased from each supplier, rather than the rebar used in the floor slab or columns (which is often unknown). A contractor would ideally prepare this documentation incrementally along the construction process, and actual quantities purchased could be audited by a link to purchase receipts. This represents an opportunity to prime the industry to develop verifiable quantities data that sets CARB up for a future reporting requirement.

In addition, we also recommend including a cutoff threshold for materials to be included in the BOQ. We suggest that any material representing 1% or more of the project's total mass, volume or cost should be included. Note that in practice, cutoffs typically serve as a guidepost for teams rather than a literal and enforceable requirement.

Cost data

Unfortunately, the detailed element-level cost breakdown data required in CARB's current proposal is not currently available at any stage in the design and construction process in the US market. Cost data is not consistently tracked at this granularity by design or construction teams, and if available, is typically considered proprietary or the basis for competitive advantage.

We anticipate that this data will be the most burdensome to collect and could risk industry support for the program as a whole. If collecting cost data, more aggregated costs (at the level of a system or trade) may be more feasible. CARB could request input from general contractors on current practices to increase the feasibility of requirements. Alternatively, CARB could consider whether funding research and data collection on a sample of projects could meet the goals of their cost data collection efforts.

Basic reporting

We commend the current requirements as the gold standard for what project-scale data collection could look like for buildings. That said, the level of effort to prepare a comprehensive bill of quantities, costs and suppliers at the building-element level of detail for all project scopes (structure, enclosure, interiors, sitework, services and FF&E) will require training, new technology, and time based on the state of the market today.

We suggest a phase-in period of a year or two with a more limited list of materials, in order to allow the industry to come up to speed with the process of tracking. **A more streamlined approach that focuses on key material quantities, especially in the short term, could help simplify this process** for both users and reviewers and be expanded over time. We recommend that CARB:

- Permit reporting of quantities and costs as total quantities by *unique material and supplier*, rather than at the element level as proposed.
- Require quantity reporting for the materials and or material categories that make up the vast majority of impacts on typical projects, and phase-in additional materials over time if needed.

Several resources may be used to inform CARB's approach here:

- CLF's [The Embodied Carbon Benchmark Report](#) offers a list of the top material contributors to building embodied carbon intensities for structure, enclosure and interior scopes including: concrete; steel; insulation; gypsum; wood and composites; aluminum; coatings; flooring and tile; glazing; and cladding.
 - While this is a good starting point, ambiguity in which specific products should be covered within those material categories leads us to observe that the above list has strong overlap with CLF's [2025 North American Material Baselines](#). We suggest CARB use this list of materials to develop a prioritized material subset for Basic Reporting. Limiting data collection to this subset is also logical if a future reduction requirement credits reductions based on comparison to material baselines.
 - The Material Baselines report also includes examples of a product naming convention and declared units that could be pre-defined in the reporting template to ensure they are reported consistently. CARB could still state that any material in the priority subset, not pre-defined in the list, should be reported if it makes up more than the cutoff rate at the project scale.
- In addition we suggest requiring select product types used for MEP and Equipment and Furnishings, that we have reason to contribute significantly to building impacts. For example:
 - Based on [The Beginners Guide to MEP Embodied Carbon](#)³ and our team's experience, priority categories for Building Services could include: Mechanical Equipment (especially air handlers, heat pumps, chillers, boilers), Ductwork, Piping (especially plumbing, mechanical, and fire protection piping), PV systems (panels and mounting racks), and Electrical equipment (especially generators, transformers, panels, and switchgear).
 - Equipment and Furnishings could include: Elevators, escalators, casework, and office furniture.
 - Sitework could include: Asphalt, concrete, steel and wood

We suggest that CARB run additional research studies separately from the reporting program to more comprehensively estimate the typical impacts of Services, Equipment and Furnishings, and Sitework, and estimate the gaps in the proposed subsets above, as we expect the reporting of material quantities for these scopes may be less accurate and complete.

Also, we recommend all projects having the option to opt-in to the WBLCA requirement which should automatically satisfy the requirements of Basic Reporting, as discussed in further detail below.

Carbon Intensity Factors

From conversation with CARB, we understand that the assignment of carbon intensity factors to the bill of quantities (BOQ) in basic reporting is voluntary. This is not currently explicit in the program guidance and should be clarified in the language and made explicit. We also suggest CARB limit discussion of carbon intensity factors during the initial phase-in of the program, to focus new users on the minimum requirements.

³ Houde K., Jensen A., Shinn K. (2025) The Beginner's Guide to MEP Embodied Carbon. MEP 2040.

WBLCA Reporting Requirements

We enthusiastically support the intent and broad scope of the WBLCA modeling and reporting requirements and appreciate the alignment with ECHO and leading WBLCA standards. That said, we strongly recommend CARB permit substitution of WBLCA in lieu of Basic Reporting (also at the Certificate of Occupancy stage using as-built quantities) rather than requiring both. We think this approach could help in several ways:

- Provide an alternative to project teams and building owners who are hesitant to share cost data, while asking them to go further with reporting.
- Encourages the use of WBLCA, which would serve to train the industry faster in a valuable reduction assessment framework that could be relied on in the future.
- If executed as recommended, this approach would provide the required information from basic reporting and also far more comprehensive impact estimates for scopes beyond the basic reporting pathway, which would be highly valuable for determining a baseline.

In addition, CARB should clearly define and further elaborate on **Product Disclosure Requirements**. As written, we cannot sufficiently comment on the degree of effort and feasibility of this recordkeeping requirement because we do not understand what it entails.

For the base scope of the WBLCA requirements, we suggest CARB commit to a single guidance document - ideally ASHRAE 240p, and consider more fully the limitations of current building LCA tools and industry practices. Below we've provided suggestions to improve and strengthen CARB's approach and situate CARB's current required scope in relation to common industry practices:

- **LCA Guidance/Standards:** We strongly suggest CARB commit to one of the guidance documents instead of offering the four options (ASTM, NRCC, 240p, RICS) which will create confusion, contradiction and variability in methods. We suggest that CARB adopt ASHRAE 240p as the most comprehensive and consistent standard planned for publication in North America. ASHRAE 240p would also provide a reference for limiting and calculating key life cycle stages. We provide the following commentary as well to support this recommendation:
 - Life Cycle Stages:
 - **A1-A4.** Industry is ready to track these stages.
 - **A5.** Great to include, but specific methodologies should be stated for their quantification (e.g., ASHRAE 240p), as LCA tools do not handle consistently.
 - **B1.** Great to include, but specific methodologies should be stated for their quantification (e.g., ASHRAE 240p), as LCA tools do not handle consistently.
 - **B2-B3.** There is not great data available currently, and most LCA tools omit these even when they say they produce results for them.
 - **B4.** Industry is ready to track this stage.
 - **B5.** There is not great data available currently, and most LCA tools omit this stage even when they claim to produce results for it.
 - **B6.** If required, a specific methodology should be referenced (e.g., ASHRAE 240p). Alternatively, would it not be possible to seek operational energy information from

other agencies rather than asking users to submit twice? With that, CARB could quantify B6 emissions from projects using a consistent method.

- **B7.** Rarely quantified, and typically very low impact. Not a high priority for collection in our opinion.
- **B8.** Very rarely quantified in practice. Could CARB not get user transportation data elsewhere?
- **C1.** Great to include, but specific methodologies should be stated for their quantification (e.g., ASHRAE 240p), as LCA tools do not handle consistently.
- **C2-C4.** Industry is ready to track these stages.
- **Quantities:** Aligned with Basic Reporting, we recommend that as-built quantities of bulk material purchases be the basis of the WBLCA, which could be tied to receipts for verification or audit.
- **Results Reporting:** We suggest requiring the submission of raw results from appropriate WBLCA tools. These results include the quantity breakdown, data source (including product-specific EPD references), and embodied carbon estimates for each modelled element. In our experience this is a streamlined way to collect quantities data with data source references without creating additional manual input.
- **Material Taxonomy:** In CLF's experience, WBLCA tools (and individual projects, as in the basic reporting requirements) will have radically different classifications for different materials. This level of detail is not included in OmniClass. We suggest that CARB provide a consistent material taxonomy that can be adopted by tools, or so that users can map their raw results once uploaded will allow intake of results across different tools to be expressed in a common way.
- **LCA Tools:** The current ISO and EN standards that are referenced in Appendix A, in combination with the scope of assessment and modeling requirements, are only possible to achieve using a limited number of WBLCA tools (Athena, Tally, Oneclick, and hypothetically Sima Pro—though it would be very onerous). As such, we suggest not listing any tools in the WBLCA reporting spreadsheet dropdown that could not meet the program requirements. We also note that the tool landscape continually evolves, so this will require updating over time.
- **LCA Data:** We think the desire to require CARB-approved EPDs will be onerous for project teams to implement. In addition CARB's guidance that "*WBLCAs may rely on currently available EPDs provided that impact results are also reported using CARB approved default emissions factors for comparison*" suggests that in the interim between now and 2030 that projects will have to provide multiple sets of data - both from EPDs and from CARB approved factors. We strongly recommend CARB permit all EPDs to be used for A1-A3 in the short term and re-evaluate acceptable data sources again in five years.
- **Building Elements:**
 - **Substructure, Superstructure, Enclosure, Interior Construction, Interior Finishes and Sitework.** These scopes are all readily quantifiable with reasonable levels of resolution through tools like Tally, One Click LCA, and Athena.
 - **Services, and Equipment and Furnishings:** We recommend CARB consider providing an alternative modeling methodology or additional modeling guidance for these scopes, or consider a phase-in over time for these scopes.
 - Similar to our recommendation for basic reporting, CARB would benefit from running additional research studies separately from the reporting program, to more comprehensively estimate the typical impacts of interiors, services, sitework and equipment and furnishings,

and estimate gaps, as we expect the WBLCA impacts reported for these scopes may be less accurate and complete than for structure and enclosure.

Considerations for Reductions

If CARB shifts this reporting approach to the certificate of occupancy stage as CLF has suggested in this document, we believe this provides an opportunity to establish a strong reduction program focused on the WBLCA reporting.

Typically, project-level reporting reduction requirements include either a percent reduction compared to a project-specific functionally equivalent baseline and/or a comparison to an absolute target (e.g. Embodied Carbon Budget (ECB) in kgCO₂e/m²).⁴ These approaches provide different motivations:

- Project-specific baselines motivate every project to explore embodied carbon reduction strategies on their individual project.
- Embodied carbon budgets set an upper limit that primarily motivates the heaviest hitters to address their absolute embodied carbon intensity.

WBLCA reporting allows for rewarding a broad set of potential reduction strategies, from design efficiencies, material alternatives and low carbon procurement. While both permit and certificate of occupancy are too late to make changes, a responsible project team will work to set themselves up for success, and a trading market as CARB implied might be used to address projects that do not comply.

Basic reporting would allow projects to claim reductions for procurement of lower-carbon alternatives (as demonstrated with product-specific and facility-specific EPDs compared to an industry average), as is done in LEED. In these scenarios, the target percent reduction would ideally be scaled to have parity with the WBLCA option based on the percent that the covered materials represent of total embodied carbon.

However, CARB could also consider developing a more simplified approach using the significant data collected in reporting. For example, projects subject to basic reporting requirements could select reduction options from a checklist of reduction strategies tailored by building type based on CARB's new dataset. For an example of a checklist approach, look at Pathway 3 in Oregon Department of Environmental Quality's Low Embodied Carbon Housing program– see the *Low Embodied Carbon Compliance Guidebook* and *DEQ Embodied Carbon Reporting Form* on the program's [website](#).

Project Reporting Tool

We support the types of information required to be reported for the Project, Building, and WBLCA Results tabs, and appreciate CARB's general alignment with ECHO Reporting Requirements and other standards. For these tabs, we think CARB has effectively focused on only the essentials. In addition, we have several detailed recommendations:

⁴ Benke, B., Jensen, A., Chafart, M., Simonen, K. and Lewis, M. (2025). *The Embodied Carbon Benchmark Report: Embodied Carbon Budgets and Analysis of 292 Buildings in the US and Canada*. Carbon Leadership Forum.

- Building Information Tab:
 - As drafted, CARB will not know if reporters included or excluded the floor area of enclosed parking in the GFA value. We highly recommend that CARB add a required GFA calculation method that either excludes or includes enclosed parking areas. After doing so, still require the “Enclosed parking area” to be reported separately from GFA so that CARB can quantify the difference. This matters a lot for quantifying embodied carbon intensities based on floor areas.
 - We recommend adding a “Building Use” column, and using the available dropdown values from the [CLF Generic Reporting template](#)⁵ “Primary Building Use” field, which mirrors CBECS and residential use types. Occupancy classification may suffice for functional equivalence, but use types are often more effective at explaining variability and will be extremely helpful if CARB performs stock modeling to determine future reduction requirements.
- WBLCA Results Tab:
 - General LCA section:
 - Add and require that the “Reference Study Period” be reported, even though it’s proposed to be required as 60 years. This is important particularly since other standards referenced have variable RSPs in some cases (i.e. ASTM E292, RICS 2023).
 - For “Source of Material Quantities”, we recommend CARB adopt the dropdown list from “Material Quantity Source” from the [CLF Generic Reporting template](#), which will provide more useful information.
 - We suggest a way for users to specify exactly which life cycle stages were included, rather than life cycle stage summaries provided in the current dropdown. Otherwise, CARB won’t know if individual stages may have been excluded as folks will default to the closest match.
 - For “LCIA Method”, we suggest CARB replace the field with or add the “Environmental Impact Data Source” field from the [CLF Generic Reporting template](#), which will provide more useful information to you.
 - Physical scope inclusions section:
 - We recommend adding a dropdown selection to the scope designation that says “Not applicable to project”. This clarifies whether something was excluded because it wasn’t modelled or was excluded because it doesn’t exist on a project.
 - LCA Results section:
 - We strongly support reporting biogenic carbon separately, as stated in Appendix A. However, the reporting template currently does not provide a clear place for those results to be reported separately.
 - Ensure that operational carbon, if reported, is reported separately from the main results in the “LCA Results” section.

⁵ Benke, B., Jensen, A., and Chafart, M. (2025). The CLF Stock Reporting Template for Building LCA Results (v1.0). Carbon Leadership Forum

Exclusions

We suggest that no exemptions or exclusions should be made for hospitals and military buildings. Both building types should have the same process to comply as any other project. This regulation does not have the power to slow down construction so is compatible even with high priority building projects in the state including hospitals and residential construction.

Conclusions

CARB reporting requirements represent an unparalleled opportunity to upskill the market to understand, measure, and report data that will facilitate future reductions. Our comments aim to maintain the robust reporting proposed by CARB while setting CARB up for success in future reduction requirements and limiting the burden on Californian projects and manufacturers where additional reporting provides diminishing returns. CLF looks forward to continued engagement in CARB's process.



Aurora Jensen
Senior Manager, Low Carbon Buildings
Carbon Leadership Forum



Jordan Palmeri
Senior Manager, Low Carbon Products, Carbon Leadership Forum
Senior Researcher, University of Washington, Life Cycle Lab



Meghan Lewis
Program Director
Carbon Leadership Forum