

WAP Sustainability's Comments to Workshop on Building Embodied Carbon, October 30, 2025

WAP Sustainability, LLC (WAP) is pleased to submit comments to the California Air Resources Board (CARB) as it develops an embodied carbon baseline and reporting regulation for covered projects and building material manufacturers. The advancement of the staff concept is impressive. It is essential that CARB understands the industry impacts, especially as other states look toward California when setting similar policy.

1.0 Overall Comments:

1.1. CARB's proposed baseline development need not be complicated.

- WAP believes that the information requested from manufacturers and building developers exceeds that required under HSC 38561.3. While WAP appreciates the attempt to collect more data to better understand the industry, it will come at a financial cost to building developers and building product manufacturers. HSC 38561.3(b) lays out the baseline for the 40% reduction:
"The baseline for the 40-percent net reduction shall be established based on an industry average of environmental product declarations reported for the 2026 calendar year, or the most relevant, up-to-date data that is available, as determined by the state board."
- CARB's proposal does not present an approach with "most relevant, up-to-date data that is available." CARB could simplify reporting by collecting building product quantities from importers, manufacturers, and building developers.

1.2. Balance the effort of data collection with the value of the data.

- CARB should clearly understand the estimated, perceived, and actual effort required to achieve the requested data quality. CARB proposes that building owners report WBLCA data in the first quarter of the year after the year in which the permit was issued, and in the following first quarter after receiving the certificate of occupancy. Double-reporting building product quantities twice is unlikely to yield higher-quality data than the time required to collect, review, and report the data. Additionally, CARB is seeking product-level information to be reported in an EPD, which could be achieved by manufacturers reporting the product-level LCA to CARB instead of paying to reverify an EPD with updated information.

1.3. Limit the length of time owners must retain data.

- Ten years is more than most tax laws require (4-7 years) for retaining data.

1.4. Minimize reporting fields.

- The proposed reporting includes numerous data fields, some of which are duplicates. CARB should identify unnecessary fields to minimize reporting time. Manufacturers, importers, and building developers may believe that they need to hire a new employee to complete this work. If a building owner receives a bid that exceeds the penalty, they will likely choose the penalty, since it's less money and time than complying. With a noncompliance penalty of up

to \$10K, some building product manufacturers and building developers may choose the penalty over the cost of a consultant to compile the information.

- For example, CARB can quickly determine the company's latitude and longitude from the address. Therefore, limit the burden on the reporter by removing this field. Provide an option to transfer the Reporter Information tab data to the Product Information tab if the reporter and manufacturer information are the same.

1.5. Clearly indicate which information will be public.

- The instructions for the CARB Embodied Carbon Importer Reporting Tool should clearly indicate which information will be made public and which information is confidential between the reporter and CARB. Some building product manufacturing processes are considered proprietary and are reported only in the LCA, not in the EPD, to maintain confidentiality. CARB should be mindful of the competitive markets and anti-trust agreements, and offer pathways for confidential product reporting only when necessary.

1.6. Map NAICS codes to common codes used in LCA.

- CARB reporting relies solely on NAICS codes, which is uncommon in building product LCA and the design and construction industry. Building product LCAs use CSI MasterFormat in the US and UNSPSC in Europe (EPD International). Project-level bill of materials also uses the CSI MasterFormat. Therefore, mapping NAICS and Harmonized System values to the LCA industry standard of MasterFormat or UNSPSC will minimize confusion, create consistency, and reduce the individual project/product consulting costs associated with mapping the information. For instance, glass products may include flat glass, windows, doors, skylights, interior partitions, glass block, and more. Are window and skylight manufacturers required to report component products along with flat glass manufacturers? If so, how is the double-counting of product-level embodied emissions accounted for within the system? Similar questions apply to cement, which is an ingredient in concrete. Further, specific steel shape manufacturers may conclude that they are excluded from reporting if relying on NAICS codes alone.

2.0 Covered Products:

2.1. Success depends on manufacturers buying into the openEPD system.

- openEPD is the bedrock protocol for digital EPDs in North America. The openEPD format allows building product manufacturers to publish different types of EPDs. The format allows for an extension that can publish a manufacturer-average EPD vs. a facility-specific EPD, or even a CARB-approved EPD. Several EPD program operators are ready to publish into the openEPD format. However, the industry is new to the concept, and it may take a few years to move toward digital EPDs. CARB can play a role in encouraging the adoption.
- The openEPD format will help manufacturers easily report to CARB. Building product manufacturers can push custom openEPD data to CARB, ensuring consistent, accurate reporting. Building owners are familiar with this process, as it is similar to using Energy Star Portfolio Manager to report operating building energy to jurisdictions.

2.2. For recently published EPDs, updating to a CARB-approved EPD will take time.

- When product manufacturers requested that CARB use EPDs for reporting, the intent was that, because EPDs are publicly recognized and third-party verified, the information would be acceptable to CARB. Due to CARB requesting specific information that will require current

EPDs to be updated (at a cost) and PCRs to be updated (with a 6-7-year timeline), it is recommended that CARB allow Method 2 to remain an acceptable reporting mechanism through 2035. For example, a building product PCR updated in 2024-2025 and published in 2026, may not see the first EPD aligned with the 2026 PCR until 2027, due to the existing EPD expiration date and the need to update the LCA, EPD, and reverify/publish.

- The additional data CARB is requesting within the EPD will require a new LCA, not necessarily minor updates to an existing LCA model. While some of the requested information is within the LCA and often the EPD (e.g., disaggregated A1-A3), using CARB emission factors and changing co-product accounting are much larger changes to the LCA process. Collecting data on co-products produced at a facility may be a time-consuming effort that delays the EPD, depending on the manufacturer's sophistication and data-collection capabilities. However, for new EPDs, this data will not likely extend the timeline because it will be consolidated with other manufacturing data requests at the start of LCA data gathering.
- The effort to update the EPD varies by product and manufacturer. For instance, it may require the manufacturer to spend many hours collecting the requested physical and economic allocation results of co-products produced at a facility. Depending on a manufacturer's record-keeping and the complexity of the products it produces, it could involve several departments. Additionally, it may require many hours for the LCA practitioner to update the LCA with the co-product data, incorporate CARB-approved emission values, update the EPD values with the revised data, and incorporate new tables specific to CARB's needs. The cost of verifying the EPD is another expense that will be negotiated with the EPD program operator and the manufacturer, and could cost thousands of dollars per EPD. Reverifying the EPD every two years is an additional cost.

2.3. Allow manufacturing facilities that produce a single product family to report using batch or facility-average EPD.

- For manufacturers that produce a single product type, such as concrete, asphalt, or aggregate, allow a batch-specific or facility-average EPD rather than requiring an EPD per concrete or asphalt mix. Concrete facilities share similar materials, processes, and production flows. Concrete plants create thousands of custom mixes, but they are all variations on the same basic ingredients: cementitious materials, aggregates, water, and admixtures; therefore, they belong to a single product family. Developing an EPD for every concrete mix may impose an unnecessary financial burden on plants. A project-level EPD or a facility-average EPD will capture the same information without increasing the cost of each unique concrete batch.
- CARB will need to define "product family" to ensure that a manufacturer of multiple similar but different products reports on each product. For example, a window manufacturer may produce windows with wood, vinyl, or carbon fiber frames, each requiring different raw materials, equipment, and manufacturing steps. Because these products differ substantially, they fall into distinct product families and would require an EPD for each product type. Providing a facility-averaged EPD would not capture the unique nature of the products.

2.4. EPDs may become more complicated to read.

- Using emissions values other than those prescribed in the PCR may lead to confusion when reading the EPD because there will be three different environmental impact values: EN 15804, ISO 21930, and CARB-approved emissions values. Further, emissions values based on EEIO are of lower quality and will not provide insight to product manufacturers. Uneducated or distracted EPD users may unintentionally cherry-pick the most advantageous values for their reporting or marketing.

- Reporting GWP values with and without RECs is recommended. Again, there is concern about the readability of the EPD. Additional education will be needed to ensure users understand the information they are extracting from an EPD. Without moving to a digital EPD format, providing this information will make PDF EPDs very long and cumbersome to read.

2.5. Accept the current LCA practice of GHG emissions data and define tiers for acceptable high-quality data sources.

- CARB should accept the upstream datasets, as identified and allowed in the covered products' PCRs. To address concerns about low-quality LCA data, CARB should define data tiers. WAP recommends that CARB adopt the following tiers of data quality.
 - Valid product-specific EPDs produced under specified PCRs (e.g., asphalt emulsion EPD for an asphalt mix)
 - PCR-specified generic background data/upstream processes
 - CARB-specified publicly available process-based data (transport, electricity, fuels, etc)
 - CARB EEIO factors converted using bridge processes
- PCRs have been developed for many upstream materials and products, such as cement (an ingredient in concrete) and asphalt binder (an ingredient in an asphalt mix.) Concrete EPDs that use cement and aggregate EPD data are more accurate. Within asphalt, PCRs exist for aggregate, asphalt binders, asphalt emulsion, asphalt mixtures, and a PCR is being developed for recycled and reclaimed asphalt. These upstream product EPDs provide higher-quality data for the final product and illustrate how these industries have adopted the PCR and EPD reporting mechanism.
- EEIO data should not be used within the LCA process. EEIO emission factors are of low quality for determining Scope 3 GHG emissions. Using high-level GHG information from rough economic models will mask genuine reduction efforts taken by those in the supply chain and will fail to credit them for this work. EEIO emission factors reduce the specificity of LCA data and are not the best practice for embodied carbon accounting in building products. Further, EEIO data incentivizes the lowest-cost materials, not the lowest-carbon materials and products.
- As a last result, allow LCAs/EPDs to use translated CARB EEIO factors using the Federal LCA Commons "bridge" process to convert EEIO data to LCI data sets (and vice versa.) Converting EEIO emission factors to LCI data better aligns with current industry practices and helps to fill small data gaps in current LCI data.

2.6. Request Product-level LCAs if seeking information about the allocation results of co-products.

- ISO 21930 provides options for allocating co-products in the LCA, when such products exist. PCR committees agree on how the physical allocation of co-products should be applied to the product LCA. However, this information is not always presented in EPDs because it's not necessary for the end-user. The co-allocation rules within a PCR make EPDs more comparable within the same category. CARB should request the product LCA from the manufacturer, if this information is even necessary.
- If CARB is seeking more information on co-products, it should indicate an expected reporting threshold to understand the level of detail necessary. For instance, crude oil refiners produce gasoline, diesel, jet fuel, asphalt binders, and more. Some of this information may be confidential, proprietary, or take extensive effort to collect. Manufacturers may choose to pay a fee rather than disclose the requested information.

- Incorporating economic allocation of co-products within an LCA or EPD is unnecessary because these are not life cycle cost analysis tools, and costs will vary significantly by plant location. The cost of co-products can be volatile over a 2-5-year period due to unexpected market factors, such as supply chain disruptions, natural disasters, or new demand for product "waste." Further, companies secure long-term contracts for high-demand co-products. Information on the demand for co-products is better obtained through commodity market research, not through EPD reporting. Manufacturing plants are designed to produce products efficiently. If the cost of a waste product exceeds the price of the product, the manufacturer will not be incentivized to generate more waste, since the plant's focus is on the product, and income from waste is a bonus.

2.7. Proposed Reporting Entities: CARB needs to define the covered building materials and products.

- The products listed are not associated with building products and/or assemblies commonly used in the building construction industry. The products need to align with the CSI MasterFormat to harmonize with the bill of materials and with EPDs. Further, CARB should prioritize primary building product reporting rather than individual components or materials.
 - NAICS 3273 highlights common concrete primary building products such as ready-mix concrete, concrete blocks, bricks, and concrete pipe. However, it's unclear whether shotcrete and grout product manufacturers are required to report. If CARB is seeking to collect 80% of the building products used in California, WAP recommends excluding these products and clearly indicating their exclusion.
 - It is not necessary to require cement reporting. Cement is not a primary building material, but a concrete and grout ingredient.
 - As with concrete and cement, requiring glass and window manufacturers to comply will lead to double-counting, since flat and plate glass, as well as laminated and insulated glass, are components of window units.
- Products missing from CARB's proposed reporting include flooring, cladding, and ceiling tiles. CARB should consider adding these products to provide more insight into building renovation products, which often account for a greater share of emissions over a building's life cycle due to their frequent replacement.

2.8. Extend the deadline for accepting facility-specific GHG emissions reporting.

- Updating PCRs to align with the CARB requirements may take multiple years. While PCRs have a 5-year expiration, program operators routinely extend the expiration date due to the time required to publish the document. For existing PCRs, program operators may open the PCR a year before the expiration date to form a committee. The committee may take months to years to update the PCR. At the same time, additional time is needed for public comment, a panel review, legal review, and formatting by the program operator, before publishing the revised PCR. Once published, it may take years for product manufacturers to update their LCAs to reflect the new PCR.

3.0 Covered Projects:

3.1. Do not exclude building projects from reporting.

- Exceptions to reporting requirements should not be extended to hospital buildings, state military buildings, or buildings rebuilt after natural disasters. Still, they should be reviewed on a case-by-case basis through a petition process. Hospitals and military facilities are critical

infrastructure projects expected to last 100+ years. The public should understand the embodied carbon impacts of constructing these projects.

- Excluding rebuilds from natural disasters disincentivizes policymakers from adopting resilient building strategies that would minimize the need for rebuilds. If a building in a known fire zone were burned down and the associated rebuild construction products were not accounted for, California would not capture the actual impact of climate change. Similar to AB 2446's justification for including housing in the reporting, all buildings must support climate-smart solutions. "California is currently facing a housing shortage, and it is imperative that the state meet its housing goals. However, meeting those goals should not come at the expense of California's climate goals. It is the responsibility of the state to find solutions that allow housing and climate targets to reinforce one another."

3.2. Utilize GWP per gross square foot of building area.

- Global warming potential (GWP) per gross square foot (or square meter) of building area is the most appropriate metric for embodied carbon. This metric is commonly used in the industry, provides a comparable unit, and aligns with ISO-compliant EPDs. Since this metric is associated with building area, the site embodied carbon should be excluded from the reporting. Incorporating the embodied emissions of a large site, including parking lot paving, walking trails, and other amenities, makes comparisons between two buildings arbitrary. For example, if a 100,000 square foot suburban office consists of a large site with parking for all 2000 employees, plus new utilities and other site work, the embodied carbon of these materials and products is easily compared to a 100,000 square foot urban office, which does not require much in terms of new site utilities and doesn't provide any parking for employees.

3.3. Projects reporting through WBLCA should be excluded from basic reporting information.

- On the buildings reporting, larger projects should not have to submit basic reporting information separately from the building LCA. All requested information should be included within the building LCA approach.
- Basic reporting does not add value to the project team's decision-making when conducting a building LCA.

3.4. Projects should only be required to report once, at the certificate of occupancy.

- One reporting date is sufficient, such as CARB's proposed Q1, after the building permit is obtained. Reporting at the occupancy phase will indicate that the project was constructed and completed. Additionally, purchased material and product quantities will be more accurate.

3.5. Limit required WBLCA reporting to A1-A3.

- For whole building LCA, estimating a building and site development's whole life carbon is admirable, but may be complicated and unnecessary to document in practice. Further, 38561.3(1) requires a focus on product life cycle stages A1-A3. All other life cycle stages should be considered optional and not penalized if the information is not reported.
 - Example 1: Data on site preparation, utilities, and other site development activities may be collected years in advance of building construction or performed by a separate owner and/or contractor before the building owner/developer takes control. Who is responsible for these emissions? If the site is cleared in 2025 with utilities placed in 2026, but the permit is not obtained until early 2028 and construction starts

soon after, what information should the building owner/developer submit in Q1 2029? Are they to report the emissions associated with the 2026 utility placement in Q1 2027? The questions lead to the larger inquiry of what data CARB is trying to collect and how it will be used to better California. Is CARB seeking data on the embodied carbon and construction impacts of construction over the course of a year? Or, the embodied carbon impacts of a building from site prep to building occupancy? It is WAP's understanding that the laws seek to understand the environmental impact of A1-A3 building materials and products. Therefore, site preparation should be excluded from reporting.

- Example 2: Data on the site landscaping development may be arduous to collect due to multiple contractors or work that occurs after occupancy. To further explain the sequencing and coordination of gathering information in a phased project, the site work may be bid and constructed by different contractors, making it unnecessarily challenging to coordinate the information. Coordination with additional contractors can be achieved at the project owner's expense. The owner may hire staff to coordinate carbon emissions directly or request additional services from the architect, thereby increasing construction costs.

3.6. Exclude cost information from reporting.

- CARB is tasked with measuring embodied carbon (A1-A3) of building products. Since product cost is not a factor in calculating carbon emissions, project-level cost data is unnecessary to report. Additionally, obtaining material and product cost information for each material or product at the permit stage can be challenging for most building projects. Often, when cost information is available, it is allocated to CSI MasterFormat division numbers rather than being as detailed as to distinguish between concrete footings and concrete columns. While an architect or contractor could make volume estimates to assign material and product costs to building elements, this comes at a cost to the owner.
- If cost data is essential to CARB, labor costs should be excluded from the building LCA. Labor rates vary significantly across the state and per project, like union projects. If CARB applies EEIO emission factors to the cost of materials, products, installation, and overhead, it further dilutes the data.
- If cost is essential, CARB should define "project cost." Some owners may exclude land, site development, financing, or contingencies. Define specifically what should be included in the project cost, including all direct and indirect costs, soft costs, fees, and other relevant expenses. Keep in mind that many owners do not like to share this information because assumptions are often applied to the value, such as cost/sf, and do not include incentives and tax benefits.

3.7. Building owners should not be responsible for collecting and retaining all covered product source disclosures.

- CARB should define the requirements for reporting entities to maintain records of product source disclosure. It is unclear whether CARB is asking building owners and developers to collect and retain product data for all covered products, or whether CARB is classifying contractors and/or building owners/developers as importers and requiring them to follow the product source disclosure requirements.
- Based on the currently proposed requirements, building owners and developers must request, collect, retain, and report extensive building product information to CARB twice during the project's development and construction. Building owners and developers should

not be responsible for storing or maintaining the source documents associated with CARB reporting forms for more than 1 year. Retaining EPDs, plant MRR, or importer records is excessive file management that offers little benefit to the owner or developer. Further, it's unclear whether all covered product EPDs would be required to meet CARB-approved EPDs (even for products produced outside California) or whether building product manufacturers in California would provide building owners with the MRR documentation.

- CARB should define whether a contractor, or other purchaser, of a large quantity of materials, is classified as a product importer. It is unclear whether a contractor would be classified as a building product importer if they purchased a large supply of windows from Germany or mass timber from Oregon for a single building's construction.