

CARB Embodied Carbon Workshop 9/19/2024

Request for Feedback

COMMENTS OF THE AMERICAN COUNCIL FOR AN ENERGY-EFFICIENT ECONOMY (ACEEE) ON “CALIFORNIA AIR RESOURCES BOARD’S REQUEST FOR FEEDBACK ON BUILDING EMBODIED CARBON”

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What major barriers do you face in generating EPDs?

New and emerging technology companies face significant barriers in generating environmental product declarations (EPDs) due to requirements for a minimum of one year of continuous production data to on which to base the results reported in EPDs. Most often these new and emerging low carbon cement/concrete technology companies lack sufficient market demand signals to maintain continuous production for one-year to meet this requirement. Given that EPDs are the predominant requirement for participating in Buy Clean (federal, state) procurement projects, not having EPDs precludes companies without EPDs from submitting a bid for those projects.

Generating EPDs are also cost-prohibitive for many small and medium-sized enterprises (SMEs). Although there are federal grants (e.g., through the US Environmental Protection Agency and Inflation Reduction Act funds and the National Ready-mix Manufacturer’s Association) that help with the cost, SMEs may also not have the time or staff to work on these grant applications and may lack resources to contract out these application submissions.

Data gaps, sufficient transparency into data sources, and harmonization are also key issues in the comparability of EPDs, so we recommend offering clear guidelines for how to use EPDs and alternate strategies for reporting carbon reduction potential of new materials and products.

Lack of consistently accepted measurement, validation and evaluation techniques, lack of consistent or broadly acceptable definitions of low carbon by the marketplace or procurement community or policymakers further impose challenges in identifying low carbon building materials and new/emerging technologies.

What suggestions do you have for overcoming limitations to EPD generation and collection?

CARB should consider alternative low carbon evaluation approaches. For example:

- 1. Evaluation Frameworks for New and Emerging Technologies:** ACEEE recently published on “A Proposed Evaluation Framework for New and Emerging Low-Embodied-Carbon Concrete.” (please see

https://www.aceee.org/sites/default/files/proceedings/ssb24/assets/attachments/20240722160832250_f1f24dd1-4b14-4fba-a305-f23847f311cc.pdf). We encourage CARB to review the presentation for ideas on how to evaluate new technologies that face barriers in generating EPDs for their innovative products. Our list of references may be useful especially for whole building lifecycle assessment (WBLCA) considerations and include resources like approaches used by DOE’s IMPEL (Incubating Market-Propelled Entrepreneurial Mindset at the Labs and Beyond) Program.

2. **Whole building lifecycle assessment (WBLCA)** offers a more holistic approach that could be applied to new, low-embodied-carbon materials to understand, measure and validate the lifecycle impact of such materials within different contexts. WBLCA of a building not only brings both embodied carbon and operational carbon into the evaluation but also illustrates the tradeoffs between the two when looking at a project from start to finish rather than at just one building material within the project in a vacuum.

In assessing a range of different carbon tools that are available, calculators help optimize the project, EPDs optimize procurement, and WBLCA optimize the system (IMPEL 2024). Calculators and EPDs are often focused on the material approach, which can take the form of analyzing mix designs or novel materials and will incentivize both manufacturers and contractors to produce and use clean, low carbon materials, respectively. In fact, manufacturers and contractors alike have applied or are considering applying for EPDs to maintain or increase their participation in public sector procurement offerings, which require EPDs under federal and state Buy Clean policies. WBLCA focus on the whole building system, in which designers analyze the impact of methods like material reuse, systems design (mechanical, electrical, plumbing, etc.), potential for carbon sequestration i.e., concrete absorbing CO₂ over its lifetime, operational versus embodied carbon, or other comparisons to design for sustainability and efficiency. Some WBLCA can also compare new construction versus retrofit of a building to help designers understand which path forward will have the least impact and be more efficient (IMPEL 2024).

3. **Greenhouse gases, Regulated Emissions, and Energy use in Technologies (GREET) Model:** Argonne National Laboratory (ANL) has developed the GREET Model that conducts LCAs for both building materials and whole buildings to evaluate embodied carbon and air emissions as well as energy and water use (ANL 2024). GREET allows users to access, modify, and create lifecycle inventory (LCI) data and make key assumptions directly in the database. Materials can be compared easily and accurately through the tool, which accounts for the step-by-step manufacturing process and associated energy, performance of the material, degradation over time, service life and payback period, and translates the data into embodied carbon/greenhouse gas emissions. GREET provides an Excel user interface that allows flexible selection of function units, system boundaries (i.e., lifecycle stages), modeling year data, material category, and many other factors. Upon run, the simulation will itemize any data gaps; once resolved, the simulation must be run again to output a dashboard of results.

Some experts (e.g., Carbon Leadership Forum) recommend picking tools that “match the resolution of the design questions, match the object of study (e.g., material or building), have databases that fit model inputs, are accessible, reasonable, and facilitate appropriate comparisons” (IMPEL 2024).

References

- ACEEE 2024. Srinivasan, Pavitra, Nora Efram, Hellen Chen, and Reshma Singh. “A Proposed Evaluation Framework for New and Emerging Low-Embodied-Carbon Concrete.” Presented at ACEEE Summer Study Buildings 2024.
www.aceee.org/sites/default/files/proceedings/ssb24/assets/attachments/20240722160832250_f1f24dd1-4b14-4fba-a305-f23847f311cc.pdf
- ACEEE-GEI 2024. Hasanbeigi, Ali, Pavitra Srinivasan, Hellen Chen, and Nora Efram. 2024. *Adoption of Limestone Calcined Clay Cement and Concrete in the U.S. Market*. Washington, DC: ACEEE and GEI. www.aceee.org/research-report/i2401.
- ANL (Argonne National Laboratory). 2024. “Energy Systems and Infrastructure Analysis.” The Greenhouse gases, Regulated Emissions, and Energy use in Technologies Model (GREET). www.anl.gov/topic/greet.
- IMPEL (Incubating Market-Propelled Entrepreneurial Mindset at the Labs and Beyond). 2024. Internal Carbon Tools Training. January 19. impel.lbl.gov/impel.