CALGreen Update: New Embodied Carbon Requirements

For Nonresidential Projects over 100,000 square feet starting July 1, 2024

The California Building Standards Commission has adopted new embodied carbon requirements that address major building materials. Starting in July 2024, nonresidential new construction projects over 100,000 square feet (and 50,000 square feet for schools under DSA) will be required to comply with one of three pathways intended to reduce embodied carbon of select building materials by approximately 10% compared to business-as-usual.

These large projects need only comply with one of the following:

- Reuse 45% of an existing building structure and enclosure
- Complete a whole building lifecycle analysis (WBLCA) demonstrating 10% lower than a baseline project design
- Obtain environmental product declarations (EPDs) for five high-impact materials that are on average lower than a specified threshold of global warming potential

The onus is on the project applicant to prove the documentation demonstrating compliance with one of the above pathways. Building departments are not expected to check whether calculations or designs are compliant, as long as the project applicant states that they have followed the code requirements and have submitted documentation attesting they have complied with all requirements.

About Embodied Carbon

The term embodied carbon refers to the greenhouse gas emissions that occur due to the sourcing, manufacturing, transport, construction, and disposal of construction materials. According to the 2021 Integrated Energy Policy Report Volume I-Building Decarbonization, produced by the California Energy Commission, “In new building projects, on average, up to 50 percent of total GHG emissions, considered over a 30-year building life, are from the embodied carbon associated with the initial construction, and nearly 70 percent of that is from just six materials—concrete and steel (by far the most significant), flat glass, insulation, masonry, and wood products.”

State Context and Background for the Requirements

California has passed legislation to address embodied carbon, including AB 2446 (2022, Holden), which sets a statewide reduction target of 40% of embodied carbon by 2035. The California Green Building Standards Code (CALGreen) first published in 2008, already includes several greenhouse gas (GHG) and embodied carbon reduction topics such as building reuse, material sources and their recycled content, and life cycle assessment, which made CALGreen the logical place to address embodied carbon in the built environment. The requirement is beginning with the largest nonresidential projects, which have the most sophisticated project teams with the resources needed to comply with minimal burden (a WBLCA typically only costs $10-20K per project). Eventually, per AB 2446, projects larger than 10,000 square feet will need to reduce their embodied carbon. By including these measures in CALGreen in 2024 and starting with the largest projects, the intent is to build industry and enforcement readiness for when future laws and regulations are in place.

About Whole Building Lifecycle Assessments

Whole building LCA is a process that compiles all the embodied carbon emissions associated with the materials used in a project. It includes estimating the quantities of each building material and multiplying it by the embodied carbon intensity of the specified material or product. This process is completed by the architect or a consultant to the project team. There are several software tools available on the market to conduct whole building LCA's, some of which are free and others which require subscriptions by the design team. Whole building lifecycle emissions are reduced by comparing a project's design to a baseline model (similar to energy performance modeling). Actual embodied carbon reductions are often accomplished through building design changes to light-weight or dematerialize projects, and/or by selecting materials that have lower-embodied carbon impacts than conventional products.

About Environmental Product Declarations

Environmental Product Declarations (EPDs) show the lifecycle impacts, including global warming potential (GWP) of specific building products. The GWP range shown in an EPD depends on the emissions intensity of the production process, types and sourcing of the input materials, and unit of product evaluated in the EPD. EPD's look like a nutrition label and have a GWP number that can be compared to CALGreen's thresholds. CALGreen's EPD pathway requires compliant EPD's for the following materials: Steel (hot-rolled strutural; hollow structural setions; plate; concrete reinforcing), flat glass, mineral wool board insulation, and concrete. Aside from concrete, these materials have been subject to EPD limits for State funded projects through the Buy Clean California Act. The concrete GWP thresholds are readily achievable by current industry practices.

Compliance Documentation and Plan Review Process

Documentation will be completed by the project design professional team and signed off on by the Design Professional of Record for the project. Data referenced to document compliance will come from online references, manufacturers, and suppliers. WBLCA's are completed by the design team. EPD's are compiled by the design team and/or contractor, and are published by product manufacturers in online product databases that are frequently used by design and construction teams. The onus of ensuring compliance through building design will fall on the project architect of record, who signs the construction documents. Data reporting templates for each compliance path may be provided as part of the guide to CALGreen. Other groups may also create standard formats that will simplify documentation by project teams and review by permit check staff.

The plan review process on the jurisdictional side will simply verify that the construction document submittal includes the required statement of compliance. The plan review staff will not be expected to audit the compliance materials, verify the accuracy of any WBLCA or existing building retention calculation, or investigate the accuracy of any referenced product data. Proof of compliance will be the project documents and sign-off by the architect of record. Note a key objective of including these embodied carbon measures is to shift attention to embodied carbon considerations early in the building design and delivery process. In future CALGreen advances a more technical approach to regulating embodied carbon may be developed, which would require technical verification by third party plan review consultants in most cases, with costs associated with this review borne by the project proponent.