



Oregon

Tina Kotek, Governor



Department of Consumer
and Business Services

Executive summary

Options To Reduce Greenhouse Gas Emissions Attributable To Building Materials is the legislative report submitted in compliance with the requirements of House Bill 3409 (2023), sec. 7, which mandates the delivery of a report that includes “findings and recommendations on options for, and the feasibility of, reducing greenhouse gas emissions that result from materials used in building construction.” The report explores embodied carbon reduction paths for the Oregon state building code as well as options for addressing embodied carbon outside of the code. The report may be accessed at <https://www.oregon.gov/bcd/codes-stand/Documents/2024hb3409-sec7-legreport.pdf> or by contacting the Building Codes Department at bcd.info@dcbs.oregon.gov to request a copy.

The Building Codes Division (BCD) contracted with two consulting organizations, RMI (formerly Rocky Mountain Institute) and the New Buildings Institute (NBI), to provide a background study on climate impacts from the buildings. The resulting study is entitled *Findings and Recommendations on the Use of Lower Carbon Materials in the Statewide Building Code and Other Means for Reducing Greenhouse Gas Emissions Attributable to Building Materials* (for short, this is referred to as Companion Technical Report by RMI/NBI) and is cited throughout the legislative report.¹ That study, which is submitted in conjunction with the legislative report, is a wealth of technical information that is accessible and is worthy of review. The legislative report is informed by that study, as well as by contributions from BCD’s Policy and Technical Services (PTS) and consultations with Oregon Department of Environmental Quality (DEQ), and aims to provide advice and education to policy makers in the Oregon Legislature.

Oregon’s building codes already incorporate efficiency standards, notably including water and energy efficiency standards, and building occupants in Oregon have benefited from the early adoption and continual improvement of efficiency codes. Historically, efforts to reduce the environmental impacts of buildings have focused on the operational emissions associated with construction-related processes or heating and cooling of the finished building. In response to these efforts, operational emissions in buildings have generally been reduced over time. This leaves embodied emissions, the form of pollution arising from resource extraction, manufacturing, transportation, installation, maintenance, and disposal of building materials and their components, as well as from processes and ingredients used in the construction of buildings, as a larger share of building carbon footprint.

About 39% of humanity’s current greenhouse gas (GHG) emissions result from buildings operations. Included in that 39% is 7% in the form embodied emissions, which is pollution arising from resource extraction, manufacturing, transportation, installation, maintenance, and disposal of building materials and their components, as well as from processes and ingredients used in the construction of buildings.² While the legislative report focuses on prioritizing reductions of these embodied emissions, it is important to consider operational and embodied emissions in tandem, as they both represent substantial opportunities to improve buildings’ impacts on the climate.³ Overall, reducing embodied emissions from

¹ [Ariel Brenner, Rebecca Esau, et al., Findings and Recommendations on the Use of Lower Carbon Materials in the Statewide Building Code and Other Means for Reducing Greenhouse Gas Emissions Attributable to Building Materials. NBI and RMI, 2024. \(“Companion Technical Report by RMI/NBI”\)](#)

² [World Green Building Council | Bringing embodied carbon upfront](#)

³ See page 14 of the [Companion Technical Report by RMI/NBI \(Ariel Brenner, Rebecca Esau, et al.\)](#)

buildings is a critical short-term opportunity, as these emissions are already expended before a building is occupied.

Oregon is a leader in voluntary actions to reduce embodied emissions of buildings. Through state legislation like House Bill 3409 (2023), Executive Order's 17-20 and 20-04, BCD is taking action to consider global warming potential (GWP) as a metric for measuring and evaluating embodied emissions of building products and the lifecycle of buildings. BCD looks to DEQ for expertise on efforts in quantifying GHG emissions as well as their body of work on estimating potential for GHG reductions in the state. Initiatives by DEQ have included incentives and have led to the development of over 1500 Environmental Product Declaration (EPD) documents for concrete mixes by Oregon's concrete producers, whole building life cycle assessment (WBLCA) training and software licenses for designers throughout the state, pilot projects that tested lower embodied emissions materials and strategies, as well as provided experience to construction teams, and incentivizing building reuse.

However, embodied carbon has not yet been fully integrated into the model codes and has challenges related to enforcement. Additionally, the cost-benefits to the consumer and to the construction industry are not yet well known. BCD acknowledges those issues will need to be considered and addressed, from training the workforce and evaluating the supply chain, to determining appropriate enforcement mechanisms in order to implement embodied emissions reductions policy in building code as well as outside of code. Feasibility concerns, such as the EPD market, parallel movement of other agencies who are active leaders in this realm, impacts on housing, and diversity, equity and inclusion impacts have all been balanced and weighed in applying BCD's principles of code adoption and code authority. Overall, market readiness will be a key consideration for policy makers moving forward.

BCD has identified three distinct paths under the statewide building code for Oregon to immediately address embodied emissions and begin realization of emissions reductions in building construction. Feasibility was a key component in considering what paths to include. These are the implementation approaches that seem most viable and effective for the boards to get started on now for the next code cycle, though further review and market transformation may be needed to operationalize them in the short term. The policy analysts, code specialists, and administrators at BCD can answer questions, provide expertise, and support.

Recommended Paths

BCD has identified three distinct paths for Oregon to address embodied carbon and realize embodied emissions reductions in buildings:

Building reuse

Retain the maximum amount of a building's existing structure when being repaired, added to, or altered. Explore Oregon's building reuse project data.

Environmental product declaration reporting

Through EPDs, analyze GWP data of Oregon's building materials to develop material-level embodied emissions limits and reduction targets.

Whole building life cycle assessment reporting

Through WBLCAs, analyze GWP data to develop Oregon's building-level embodied emissions limits and reduction targets.