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**Re: Net-Zero California Comments on the September 19, 2024 Workshop to Discuss Embodied Carbon in Buildings**

Dear California Air Resources Board (CARB) staff,

Thank you for the opportunity to comment on CARB’s workshop on embodied carbon in buildings held on September 19, 2024. With this letter, we highlight three existing state climate priorities as identified in the 2022 Scoping Plan that align with the goals of AB 43 and AB 2446 and could be considered as pathways to help lower the lifecycle emissions from building materials and the built environment in California: wood biomass utilization, industrial decarbonization and sustainable community strategies.

1. **Wood biomass utilization**

Wildfires are a significant contributor to California’s greenhouse gas (GHG) emissions profile, with the state experiencing increasingly severe and frequent wildfires. In 2020 alone, wildfires [accounted](https://ww2.arb.ca.gov/sites/default/files/classic/cc/inventory/Wildfire%20Emission%20Estimates%20for%202023%20Final.pdf) for over 100 million metric tons of CO2 emissions, an amount greater than the total emissions reductions achieved by the state since the passage of AB 32. California has committed to reducing the risk of catastrophic wildfire by treating 2.3 million forested acres per year for fuels reduction. However, these efforts are expected to [generate](https://ww2.arb.ca.gov/our-work/programs/ab-32-climate-change-scoping-plan/2022-scoping-plan-documents) millions of tons of biomass waste, as well as some merchantable timber, annually. Current practices of leaving biomass waste to decompose or open pile burning could add substantial new emissions to the state’s inventory. The 2022 Scoping Plan identified the need to collect and convert available materials into low-, zero- and negative-carbon products, including clean fuels and durable wood products, in order to achieve California’s ambitious net-zero emissions goal.

Durable wood products, such as cross-laminated timber derived from merchantable timber as well as potential new methods that incorporate biomass waste into building materials, such as biochar, present an [opportunity](https://www.pnas.org/doi/10.1073/pnas.2019073118) to reduce embodied carbon in the building sector while simultaneously addressing California’s biomass crisis. These products have the ability to store carbon for the duration of their use in construction, as well as avoid emissions from traditional carbon-intensive materials manufacturing like concrete and steel. Incentives can help expand the use of durable wood products and achieve carbon benefits in California. The Governor’s Forest Management Task Force is leading efforts to develop a statewide biomass utilization strategy which seeks to promote innovative non-combustion uses of biomass. In addition, the state has stood up some initial grant programs to enhance biomass utilization, including IBank’s [Climate Catalyst Fund](https://www.ibank.ca.gov/climate-financing/climate-catalyst-program/) and CAL FIRE’s [Wood Products and Bioenergy Grant Program](https://www.fire.ca.gov/what-we-do/natural-resource-management/environmental-protection-program/wood-products-and-bioenergy). A recurring incentive under a potential embodied carbon program would improve project financing and enable wood products as an option in conjunction with key strategies in fuels and carbon removal.

1. **Industrial decarbonization**

The industrial sector is California’s second largest source of GHG emissions, [accounting](https://ww2.arb.ca.gov/ghg-inventory-data) for over 20% of the state’s emissions in 2022. This is because many industrial operations, such as cement and chemical production, require extremely high temperatures (e.g. over 1,000°C) that are conventionally achieved by burning fossil fuels. Emissions are also inherent to the production process themselves. For example, cement manufacturing is difficult to decarbonize as nearly [60%](https://ww2.arb.ca.gov/sites/default/files/2023-10/SB596%20Community%20Meeting%20Slides%20Final.pdf) of emissions are attributed to process emissions and are largely unavoidable. This is particularly problematic as cement is widely used in California’s infrastructure, playing a critical role in buildings, highways, bridges and more.

Carbon capture and storage (CCS) technologies can play a role in capturing CO2 emissions directly from industrial operations. Carbon capture could be retrofitted to existing facilities to enable emissions reductions. Direct air capture (DAC) may also serve as a complementary approach by using industrial waste heat to remove CO2 from the atmosphere and compensate for hard-to-abate sources. The integration of carbon capture and direct air capture and storage in industrial processes presents an opportunity to reduce the lifecycle emissions of building materials and the built environment.

California has advanced some related on industrial decarbonization. [Senate Bill 596](https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=202120220SB596) requires CARB to achieve net-zero GHG emissions for cement used in California by 2045. [Senate Bill 905](https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=202120220SB905) requires CARB to develop regulations for a statewide carbon capture, removal, utilization and storage program. Additionally, the Low Carbon Fuel Standard Program [incentivizes](https://ww2.arb.ca.gov/sites/default/files/2020-03/CCS_Protocol_Under_LCFS_8-13-18_ada.pdf) the use of CCS and DAC in the production of low-carbon fuels. At the federal level, the [45Q](https://crsreports.congress.gov/product/pdf/IF/IF11455) tax credit offers financial incentives for the deployment of CCS and DAC technologies. These policies create a framework that could be leveraged in support of an embodied carbon program that incentivizes building material emissions reductions.

1. **Sustainable community strategies**

California’s urban development is characterized by sprawling, low-density and energy-intensive housing, as well as car-dependent communities that increase vehicle miles traveled (VMT). Land-use strategies that promote more sustainable communities, including high-density and energy-efficient infill as well as the establishment of urban growth boundaries, could reduce embodied carbon in the built environment compared to a no-policy alternative that results in status quo development patterns. Related greenhouse gas reductions could come in the form of VMT reduction associated with these strategies.

The 2022 Scoping Plan identifies the importance of policy changes at the local level and in other state agencies as key to realizing the above land-use strategies. New protocols could incentivize these policy changes by crediting the avoided greenhouse gas emissions in the built environment and VMT. This would align with other state policies, include SB 375 and more recently [E.O. N-2-24](https://www.gov.ca.gov/wp-content/uploads/2024/07/infill-EO.pdf).

**Conclusion**

Wood biomass utilization, industrial decarbonization and sustainable communities strategies are potential options for reducing embodied carbon in buildings and decarbonizing the built environment, are current state climate priorities and could be considered by CARB staff as part of this new program.

Sincerely,

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