CNCA Game Changers | Regenerative Systems and Economies

Topic. Embodied Carbon Funding Priorities

Leadership. The Carbon Neutral Cities Alliance (CNCA) members guiding this effort are San Francisco, CA, USA; and Vancouver, BC, Canada.

Problem statement. If cities establish a total carbon balance to account for operational carbon, embodied carbon, and carbon drawdown together, local carbon neutrality goals can be advanced significantly, yet cities struggle to: (1) gain industry awareness of the best embodied carbon mitigation practices; and (2) enact policies and regulations that reduce embodied carbon in construction processes and equipment use for both new construction and renovation of existing building stock. Key issues are:

- Shifting to building practices that encourage deconstruction/reuse when a building reaches end-of-life
- Allowing for greater materials reuse in buildings, and thinking of these materials as investment assets
- Increasing the attractiveness of wood and other bio-based materials for construction
- Regulating embodied carbon in local building stock and building internal and external capacity to do this work
- Using policy to drive shifts in the market and make materials re-use in new construction and large renovations the standard

Theory of change. The rate of global urbanization is high, and cities must accommodate for a growing urban population. Embodied carbon is increasingly important as operating emissions from buildings decrease over time. Cities need to innovate faster to transition towards more sustainable and circular building practices before carbon is "locked-in" using standard practices. CNCA members have identified the following game changing actions to reduce embodied carbon:

- Adopt local policies that mandate reduced embodied carbon (e.g., mandating low-carbon cement use)
- Revise building codes to allow for more alternatives like wood or prefabricated materials
- Have materials such as concrete, steel, wood, windows, and facades - among many other resources - upcycled, repurposed, or properly recycled into other building projects or new products
- Switch building design as well as building materials, to reduce perhaps unnecessary items like setbacks and extra levels of parking
- Use civic procurement to stimulate supply and demand to foster new business opportunities within the construction sector
- Highlight the construction and deconstruction benefits beyond carbon reduction, such as promoting strong local economies using locally sourced materials and hiring locals, reducing noise and construction dust pollution by using prefabricated materials that can be brought

to the site and snapped into place, and using high quality materials that can be upcycled after their useful life has been served in one form

Funding priorities. The CNCA Game Changer Fund seeks to support city efforts that build regenerative systems and economies through embodied carbon reduction initiatives. Table 1 outlines funding priorities and targeted outcomes of successful embodied carbon reduction efforts as identified by CNCA members. As funds are raised, CNCA will call for projects that advance these priorities in measurable ways.

Table 1. Embodied Carbon Funding Priorities and Targeted Outcomes.

Funding Priorities:	Targeted Outcomes:
● The adoption of local policies that mandate reduced embodied carbon in the built environment ● The adoption of policies requiring zero-emission construction equipment ● Tools that standardize how cities quantify and regulate embodied carbon, such as calculating embodied carbon by square foot ● Projects and/or case study creation that identify best practices across building typologies to reduce embodied carbon through material choices and waste reduction ● City-industry partnership development to drive innovation of low carbon building materials ● Policies that allow for and incentivize local market development of reclaimed/recycled building materials	● Embodied carbon initiatives are supported by external partners across sectors, both locally and regionally ● Communities are engaged to promote the benefits of local and regional embodied carbon reduction actions ● Meaningful data on embodied carbon is available to support messaging, and embodied carbon is successfully scaling ● Markets are established to reclaim materials for use in new construction or renovation ● A clear policy pathway is available for the regulation of resource use based on embodied carbon ● Buildings are constructed with bio-based materials