Securing the Future of Our Forests and Cities

The future of global forests and cities are bound inextricably together. Only through their carefully managed symbiosis can we simultaneously reverse climate change, restore forest health and stability, and meet the impending material demands of global urbanization. We need to make the process of building a force for climate restoration and biodiversity enhancement rather than a source of emissions, land consumption, and solid waste.

Our Global Challenge

+ Building sector activity (measured over the life cycle of buildings) now accounts for 42% (UNEP 2022) of annual anthropogenic GHG emissions. By 2050, half of those will be embodied emissions.

+ Between 2023 and 2050 the number of buildings is estimated to double worldwide. Projected new urban construction alone, if realized using "business as usual" materials and methods, would generative 70 Gt of atmospheric CO_2, depending on per capita floor area and the carbon intensity of material manufacturing (Churkina et al. 2020)

+ Meanwhile, the global forest carbon sink is under extreme pressure due to the conversion of forests for agriculture, extreme disturbance (wildfire, drought, and disease) accelerated by climate change, and ecosystem degradation caused by unsustainable forestry practices (e.g. Curtis et al. 2018).

A Regenerative Future for Cities and Forests

Efforts to merely decarbonize the current urban building material palette, consisting largely of concrete and steel, are unlikely to reverse the building sector's impact on our climate. In addition to attempts to increase manufacturing efficiencies for concrete and steel, we need a *systemic overhaul of the construction sector* that:

+ Replaces a significant portion of the carbon-intensive material required to address urgent housing and infrastructure need –mainly in the Global South— and the retrofitting demands of existing global housing stock with regeneratively-sourced, bio-based materials.

+ Incentivizes investment in sustainable forest management, the expansion of forest cover, and the conservation of forests of high biodiversity value.

+ Establishes equitable, low-carbon value chains that prioritize regional bio-material sourcing from forests and agricultural and construction waste flows for the manufacture of durable, carbon-storing building products.

+ Ensures that these products remain in use and circulation over multiple building life-cycles through design for disassembly methods and material reuse scenarios to maximize carbon storage benefits and mitigate climate change.

+ Encourages urban densification through creative reuse of brownfield areas and existing urban buildings and through careful control of the urban edge and wildland interface.

This systemic overhaul of construction sector consumption embraces the power of nature-based carbon capture and the potential of construction-based carbon storage instead of focusing on largely unproven technological solutions with potentially significant production and construction stage impacts. A transition from a fossil economy to a bio-economy in construction offers an opportunity to distribute more evenly socioeconomic access and opportunity.

Policy Recommendations

Policy makers and investors should support systemic change via regulations, finance, new technologies, and building cultures that lead to long term net storage of carbon in urban infrastructure and forests through the following principles:

+ Develop, adopt, and enforce internationally consistent standards and regulations for whole life carbon accounting and ecosystem impact assessment underpinned by high-fidelity, regionally specific data sets.

+ Combine continual field observation, scientific dynamic modeling and/or remotely sensed measurement (LIDAR etc.) with indigenous cultural knowledge of forest stewardship to continually assess forest stocks, carbon pools, and biodiversity.

+ Strengthen and rigorously enforce forest safeguards and incentivise the application of good practices and independent certification programs (such as FSC, PEFC) whose standards should be regularly reviewed to ensure management effectiveness, promote ecologically sustainable harvests, enhance biodiversity, observe chain of custody requirements, limit forest land conversion, and
support local communities.

+ Acknowledge embodied carbon in existing building stock as an environmental carbon "sunk" cost. Require embodied carbon assessments of both proposed demolition and new building and promote moratoria on indiscriminate demolition to reduce the carbon cost of new construction.

+ Transform carbon into a structural asset. Pilot and track whole-life carbon monetization through regulatory credits for maintaining both forest carbon pools and construction-based biogenic carbon storages.

+ Link planning approvals and procurement protocols to strict carbon budgets.

+ Require "design-for-disassembly" instructions and material/component reuse scenarios as a prerequisite for building permits to encourage long-term durability of construction-based carbon storages and amortizes the environmental "debt" of embodied emissions and associated impacts.

+ Redirect wood from use as a biofuel into durable building products and assemblies that store carbon for as long as the building is maintained.

+ Promote circularity of wood consumption through the use of secondary wood sources to minimize demand for primary wood and associated land impacts.

+ Invest in and promote the development of innovative uses of wood-fiber in all its forms focusing
on the residues of silvicultural treatments and lower grade and currently non-merchantable species.

+ Redirect funding to advancing national economies to support innovation in bio-based material and sustainably sourced forest product development through investment in both research and practice

+ Incentivise and support sustainable forestry and low carbon manufacturing with investment in professional training and workforce reskilling programs that bolster the transition to a bio-building economy.

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AUTHORS

Alan Organschi (organschi@bauhauserde.org)
Philipp Misselwitz (misselwitz@bauhauserde.org)
Scott Francisco (scott@pilot-projects.org)
Paul King (p.king@builtbn.org)

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