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## How wood skyscrapers could help save our forests — and reduce wildfire risk

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By Rod Griffin, Senior Writer, *Environmental Defense Fund*

*During the late 19th and early 20th centuries, the lumber industry decimated many of America's forests. Could it now help restore them to health — and reduce wildfire risk at the same time? The emerging market for cross-laminated timber, if developed responsibly, could benefit both the timber industry and the environment.*

Wood skyscrapers? It sounds implausible, but engineering innovations in wood technology are changing the urban landscape — and the skyline. From Chicago to Tokyo, the race is on to build the tallest wood-framed skyscraper in the world.

Until recently, one main drawback of wood — besides fire — was that stick-framed buildings generally top out at five stories, owing to the limiting load-bearing capacity of wood. The emergence of cross-laminated timber (CLT) has changed the equation. CLT is made by gluing planks in perpendicular layers, creating thick panels that are as strong as steel or concrete.

At 12 stories, the Framework Building in Portland, Oregon, is currently the tallest all-wood structure in the United States, but architects in Chicago and London have plans for 80-story residential towers made from wood. Recent innovations make it possible to create CLT slabs 20 inches thick and beams spanning more than 60 feet. Think plywood on steroids.

The biggest benefactor from the wood craze could be the environment. Buildings made with cross-laminated timber account for less than half the carbon emissions of structures using steel and concrete, according to a recent study by Oregon State University. And they are designed to meet the same fire and earthquake safety performance criteria as steel and concrete structures.

### The Fourth Wave of Environmental Innovation

Environmentally conscious entrepreneurs in Silicon Valley have taken note. [Katerra](#), a construction design-and-build startup based in Menlo Park, is developing a CLT manufacturing facility in Spokane, WA. The 270,000-square foot facility, the nation's largest for CLT, will employ 150 people.



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“Construction remains one of the most stagnant major industries in the world, still using many of the methods first deployed in the 19th century,” wrote Katerra CEO Michael Marks in a recent trade publication. Katerra hopes to change that, and is banking on the idea that CLT will become the backbone for future generations of high-performance, low-carbon buildings.

“The 19th century was the age of steel, and the 20th was the age of concrete,” says Michael Green, a Vancouver-based architect and leading proponent of wood building construction. “This century is the new age of timber.” The problem is not the science, he says, it’s changing people’s opinions about what is possible.

Buildings are responsible for nearly 40 percent of global greenhouse gas pollution, more than transportation. Much of a building’s carbon footprint results from its lifetime energy use, but another big part is from its construction. The manufacture of concrete and steel accounts for an estimated 8 percent of greenhouse gas emissions. Replacing some of that with wood would sharply reduce the building sector’s carbon footprint.

“If we are going to deal with climate change, it’s all about moving away from carbon intensive building materials and moving to carbon sequestering materials,” says Green. (Green’s [TED Talk](#) about timber skyscrapers has been viewed more than 1.3 million times — not bad for a lecture on architecture.)

If this market for CLT takes off, it could also help restore the health of America’s forests, and simultaneously reduce the risk of wildfire. Most forest ecologists agree that thinning forests is critical to reduce fuel load. The question is how to do it sustainably. Historically, small diameter trees and underbrush, when harvested at all, have been converted to low-value wood chips, pulp or biomass. CLT is a much higher value product with potential to help revive struggling rural communities.

“It’s a potentially powerful way to monetize the ability to restore our forests, remove some of the fuel load and even start to create a more complex working forest,” said Gene Duvernoy, the founder and former CEO of Forterra, a Northwest conservation group.

CLT could offer a way to move from an extraction-based economy to a restoration-based economy. The U.S. Forest Service estimates that between 65 and 82 million acres, from Alaska to Florida, are in need of restoration on lands within their 193-million acre forest and grassland system.

The possibility of a steady supply of small-diameter wood could encourage mill owners to consider investing in CLT manufacturing, much as Katerra has done. CLT products could “reduce the risk of severe wildfires, improve habitat, water quality and forest health, create local jobs and boost rural economies,” wrote Brent Davies, VP at Ecotrust in a recent blog post. Building this way also has local benefits, too. It speeds up construction because many components are prefabricated and sourced locally.

Converts include Wade Crowfoot, California’s Secretary for Natural Resources. “Solving the challenge of catastrophic wildfire and creating a climate resilient forest will require a partnership among different levels of government, environmental groups and businesses,” he says. “We don’t want to go back to the days of spotted owl controversy between loggers and environmentalists in the Northwest. A lot has changed since then. We have to figure out how we can utilize innovation and business investment to



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manage our forests in ways that improve their ecological health, as well as sequester carbon and protect public safety.”

The emerging market for cross-laminated timber could help. Analysts estimate the market potential in the United States is \$4 billion, but sales could eventually grow far beyond that.

There are challenges, to be sure. Building codes and the absence of local mills manufacturing CLT are a problem, but support is growing. The 2018 Farm Bill included provisions that support mass timber, including CLT. Additionally, the U.S. Forest Service’s Wood Innovations Grants program, also supports new and traditional uses for wood and provides funding to a handful of projects with the goal of expanding wood markets and promoting wood as a building material.

Washington State recently approved building code changes that will allow for the structural use of mass timber in buildings as tall as 18 stories. “The 19th century was the age of steel, and the 20th was the age of concrete,” says Green. “This century is the new age of timber.” The problem is not the science, he adds, it’s changing people’s opinions about what is possible.

John Muir once said “the big tree is Nature’s masterpiece,” referring to California’s majestic redwoods, which can grow to be 40 stories tall. If visions for CLT come true, the wood skyscraper could be mankind’s architectural masterpiece.

The sky is the limit.

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