

# Shrinking the carbon footprint of timber construction

August 15 2022, by Lisa Ottenhaus

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Credit: Atlassian

Developer Thrive Construct recently announced the [world's tallest steel-timber hotel](#) to be built at Victoria Square, Adelaide. Australia has caught onto the trend of building taller in timber, with other [plans for three buildings](#) 180–220 meters high submitted in Perth and Sydney. These would more than double the current world record for a timber building.

Tall timber buildings, made entirely of mass timber (layers of wood bonded together) or steel-timber and timber-concrete hybrid construction, are gaining popularity worldwide. Every couple of months a yet taller timber building seems to pop up somewhere. My colleagues and I joke that we have stopped trying to keep up.

Good to see Australia is pushing forward with the development of tall timber buildings. Even better that I happen to work in one!  
The State of Tall Timber: A Global Audit  
[@aurecon @25king](https://t.co/VO7axd8ZIK)  
[pic.twitter.com/fl9koLwC9V](https://pic.twitter.com/fl9koLwC9V)

— Evelyn Storey (@EvelynStorey) [June 4, 2022](#)

Timber is a sustainable, renewable material that stores carbon while in use, and the appeal of using it in [skyscrapers](#) is clear. But I worry that focusing only on the tall means we overlook the "middle": apartment buildings, hospitals, schools and shopping centers. Buildings like these are dominated by concrete, steel and brick, all of which are carbon- or energy-intensive materials.

The "middle" is not sexy, and probably won't make the news, but it's where [timber construction](#) can have a significant sustainability impact.

A [2017 study](#) found Australia's construction sector is responsible for 18% of the country's carbon footprint. Current emissions are expected to [double by 2050](#) if we don't change the way we build.

Change is challenging. Developers and designers favor familiar construction materials and methods where cost estimates are straightforward. Timber requires a change of thinking and early contractor involvement to be cost-competitive.

But if we truly want to do something about our nation's carbon footprint, the whole construction industry [urgently needs to shift](#), with [Australian government support](#), towards renewable, low-carbon construction materials and methods. This means to *build with timber if we can, use steel and concrete if we must*.

## **Timber technology is transforming construction**

The Australian timber industry has embraced mass timber such as glue-laminated timber (glulam or GLT) for beams and columns, and cross-laminated timber (CLT) for panels. Mass timber is more homogeneous than sawn timber, resulting in higher strength, and allowing us to build taller than ever before. Australia's [third CLT plant](#) is set to open in 2023 in South Australia.

Globally, timber has reached new heights over the past 15 years. Noteworthy projects include the University of British Columbia's [Brock Commons](#) student accommodation, 53 meters high and made of mass timber and concrete. The tallest timber building until recently was the 85-meter-high [Mjøstårnet](#) in Norway, made entirely of CLT and glulam. It lost its title to [Ascent](#), an 86-meter, 25-storey, timber-concrete tower in the United States.

Hardly a week goes by without a 'new' world's tallest timber building.

This is the latest. Timber core (!!!), floors, columns and beams. 100m or 33 storeys tall. Low carbon architecture.

<https://t.co/HVIO5Q6lR0> [pic.twitter.com/xgqtrsMidM](https://pic.twitter.com/xgqtrsMidM)

— Philip Oldfield (@SustainableTall) [April 15, 2022](#)

In comparison, Australia's tallest buildings to date reach a mere ten

stories. Australia's "first" was Lendlease's [Forté Melbourne](#), a CLT apartment building finished in 2013. Aurecon's [25 King Street](#) in Brisbane was Australia's first open-plan office building, 52 meters high and made entirely of mass timber.

Another interesting "tall-ish" timber building is [Monterey Kangaroo Point](#) luxury apartments in Brisbane. The developers Gardner Vaughan opted for a relatively lightweight solution of CLT and a single concrete core, as the building stands above the Clem Jones Tunnel.

Australia is determined to go tall in timber. The University of Queensland's [Future Timber Hub](#) is studying how to build taller timber buildings, including extensive research on [fire safety](#). Better understanding of fire behavior has driven a change in [legislation](#), lifting height limits on timber buildings, and boosted developers' confidence to [plan much taller buildings](#).

Building tall in timber is an art, technically challenging, and exciting for engineers and architects alike. I know this since I researched the seismic design of connections in tall timber buildings for my Ph.D. I am still involved in tall timber research with the [Council for Tall Building and Urban Habitat](#), and European research on the [Holistic Design of Taller Timber Buildings](#).

And what's not to love about timber? It practically grows itself, stores carbon in durable wood products, can be cascaded into other timber products, and used as fertilizer for sustainable forests at the end of its life.

But building taller and taller timber buildings alone isn't the answer to the climate crisis.

In 2011, Forest and Wood Products Australia (FWPA) [reported](#) on the

opportunities and constraints of timber construction. Its report identified multi-residential, educational and office buildings as having the biggest potential for building with timber.

Almost all of these buildings are still being constructed out of concrete and brick. Despite [efforts to make both materials "greener"](#), their production currently consumes vast amounts of non-renewable resources and emits a lot of carbon.

## **So what's stopping us?**

FWPA's report identified the biggest problem as a lack of timber construction expertise. This is not surprising, since Australian universities offer hardly any timber courses.

The University of Tasmania offers a graduate certificate in timber design for professional engineers. The University of Queensland is the only other Australian university offering a dedicated timber design course to structural engineering undergrads.

In response to the construction industry's lack of timber knowledge, WoodSolutions, the educational branch of FWPA, has been running an entire [mid-rise advisory program](#). It allows those exploring mid-rise timber solutions to get free information and advice from a group of experts.

Advancing structural timber engineering education is only one piece of the puzzle. We also need a shift of mentality to move past the idea that timber can only be used in detached single-family homes. In fact, we need to move away from such homes altogether. The federal HomeBuilder grant scheme led to a [nation-wide timber shortage](#) and added to urban sprawl.

Instead, we need to embrace well-built, mid-rise apartment buildings made from engineered timber. This material can [safely use lower-grade wood](#) and take the pressure off timber supplies.

And why stop there? We have the tools and the knowledge to build [high-performance timber buildings](#). [Proper design and detailing](#) can slash energy bills.

Tall timber buildings are exciting, and we shouldn't stop dreaming tall, but we need to focus on the missing middle to make construction sustainable.

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Provided by The Conversation

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