

Bamboo
Breakthrough:
The Next
Frontier
2026-2035



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About the Bamboo Society of Australia (BSA)

Established in 1998 and incorporated in Queensland in 1999, the BSA is the national voice for Australia's bamboo industry. An initial focus on horticulture and agriculture has evolved into a commitment to harness bamboo's full potential across multiple sectors. BSA champions a vision that delivers low-carbon construction materials, restores degraded land, strengthens regional economies and positions bamboo as a cornerstone of a more sustainable future.

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The Bamboo Society of Australia pays respect to First Nations people, Traditional Custodians and Elders, past and present. We honour their cultural, spiritual and knowledge practices in caring for Country, essential to sustainable land stewardship, and commit to collaborating with First Nations people to grow the engineered bamboo industry.

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Foreword

A roadmap gives us a destination and a pathway. What matters now are the first steps we take together.

Australia has a significant opportunity to develop an engineered bamboo industry that brings together regenerative agriculture, advanced manufacturing, lower-carbon construction materials, regional economic development, research and innovation.

This roadmap sets out how that opportunity could develop over the next decade and what needs to happen to make it possible.



For me, this opportunity is deeply personal. My father founded House of Bamboo in 1972. When I stepped in to support the business in 2011, what began as duty grew into a calling. Inspired by my father's entrepreneurial spirit and my mother's resilience as a refugee, I have spent the years since exploring what bamboo could contribute to Australia. This roadmap is part of the legacy I hope to leave for my children and for all Australians.

Our opportunity is to turn this roadmap into action.

Both imported and native bamboo species have grown successfully in Australia for well over a century.

What excites me about bamboo is that it is more than a material. Bamboo is a regenerative system. It can be harvested without replanting, regenerate from its rhizome root system and contribute to soil restoration while storing carbon. Over a 30-year cycle, bamboo delivers 25 harvests compared to timber's one.

Bamboo challenges conventional forestry. Unlike timber, it avoids clear-felling, regenerates naturally and supports biodiversity. It delivers far greater environmental returns per hectare yet remains overlooked in forestry programs and funding frameworks.

The economic analysis underpinning this roadmap demonstrates the scale of the opportunity. Realising it will require financial investment, research partnerships, demonstration projects, technical expertise, industry participation and government support. It will require collaboration, leadership and partnerships across many sectors. One of the best ways to be part of this is to join the Bamboo Society of Australia.

I have watched Australia's understanding of bamboo change enormously since my father started his business more than 50 years ago. Now we have a roadmap and the opportunity is clear. If you or your organisation can play a part, we would love to hear from you.

Jennifer Snyders

President

Bamboo Society of Australia

Executive Summary

Australia's housing, climate and industrial ambitions are increasingly interconnected. Decisions about what we build are also becoming decisions about emissions, manufacturing capability, regional jobs and supply chain resilience.

Few materials have the potential to contribute to all these priorities. Engineered bamboo is one of them.

Already used internationally in structural building applications, engineered bamboo combines rapid renewability with strong structural performance.

Unlike conventional forestry, bamboo matures quickly and can be harvested annually without replanting. In the clumping species proposed for Australia, culms are typically ready for structural use in around five years – generally a four-to-six-year window depending on species variety. Bamboo also stores carbon, restores degraded land and can be manufactured into structural building products that complement traditional timber.

Independent economic modelling by Deloitte Access Economics demonstrates that Australia has the opportunity to establish a nationally significant engineered bamboo industry.

Economic opportunity by 2035 (high-growth scenario)

- Up to **A\$847 million** annual market
- Approximately **A\$906 million** contribution to GDP
- **1,840** additional jobs
- **250,000 m³** annual production
- Material equivalent for **16,600 homes**
- **430,000 tonnes CO₂-e** avoided annually
- Around **1.5%** of Australia's current upfront embodied built-environment emissions.

Deloitte Access Economics also identifies several key challenges. Australia currently lacks the coordinated plantations, processing capability, manufacturing capacity, standards, certification pathways and market development required to establish a competitive domestic industry. Success will depend on coordinated action across the entire value chain.

Bamboo Breakthrough: The Next Frontier 2026–2035 is the industry's response.

Roadmap Approach

Building on the findings of Deloitte Access Economics and informed by Australian and international expertise, this roadmap sets out the practical actions needed to establish an Australian engineered bamboo industry over the next decade. It focuses on six priority areas:

- Investment and market development
- Standards, testing and certification
- Policy advocacy and stakeholder engagement
- Research, innovation and technology development
- Plantation establishment, harvesting and processing
- Carbon recognition and accounting.

The roadmap outlines a phased approach to establish a national bamboo industry by 2035, providing a coordinated pathway from feasibility studies and pilot projects through to commercial-scale plantations, domestic manufacturing and market adoption.

Foundations (2026–2028)	Pilots, project standards and feasibility studies.
Technology integration (2028–2029)	Adapted forestry equipment for early plantations and small-scale processing.
Market scaling (2030–2031)	Housing pilots, certification and supply chain development.
Commercialisation (2032–2033)	First domestic harvests, regional jobs and construction roll-out.
Expansion (2034–2035)	20,000 hectares planted, in line with Deloitte high growth scenario.

A domestic engineered bamboo industry has the potential to diversify Australia’s fibre supply, strengthen regional manufacturing, create new opportunities for First Nations partnerships, rehabilitate degraded land and contribute to Australia’s transition to a low-carbon economy.

Australia is currently the only continent without a structured bamboo industry. Countries such as China, Vietnam, Indonesia, India, Brazil and the Philippines are scaling rapidly, positioning bamboo as a mainstream construction material. Europe, the United States and Africa are also markets starting to emerge.

This roadmap provides a framework for government, industry, researchers and investors to recognise bamboo as a regenerative building material and grow the industry together.

“With 1.2 million houses on the agenda as part of the Housing Accord, the demand is clear given the current housing crisis. The market is there, but the key is connecting supply to this demand. In a competitive industry, Australia should play to bamboo’s strengths – such as its embodied carbon advantages and compatibility with modern construction methods – to ensure its success.”

Shane Keating, Executive Director, Building Policy,
Housing Industry Association

1.Introduction

Australia's housing, climate and industrial ambitions are increasingly interconnected. Decisions about what we build are also becoming decisions about emissions, manufacturing capability, regional jobs and supply chain resilience. Few materials have the potential to contribute to all these priorities. Engineered bamboo is one of them.

Already used internationally in structural building applications, engineered bamboo combines rapid renewability with strong structural performance. It can complement traditional timber products while helping diversify Australia's construction material supply, create regional manufacturing jobs and reduce embodied carbon emissions.

In 2026, the Bamboo Society of Australia partnered with Deloitte Access Economics to assess the economic potential of an Australian engineered bamboo industry. The BSA asked Deloitte to test what level of industry growth could be supported under realistic market conditions, against an initial aspiration of producing around 500,000 cubic metres of engineered bamboo per year by 2035. As a guide to the land required, every 100,000 cubic metres of annual production would require around 8,000 hectares of bamboo plantations.

This independent economic analysis confirms the scale of the opportunity. Under a high-growth scenario, a domestic engineered bamboo industry could become a market with a value of up to A\$847 million annually by 2035, contributing approximately A\$906 million to Australia's GDP and creating 1,840 additional jobs.¹

The modelling found that if Australia could produce around 250,000 cubic metres of engineered bamboo annually – enough material for the equivalent of around 16,600 Australian homes – this could reduce greenhouse gas emissions by around 430,000 tonnes in 2035.

These findings position engineered bamboo as a practical solution to Australia's housing shortage by expanding the supply of low-emission building materials for new homes. This is the equivalent to removing around 170,000 cars from Australian roads or saving around 1.5% of the built environment's upfront carbon emissions.

The Deloitte Access Economics analysis concludes that this opportunity will not emerge by chance. Australia currently lacks the coordinated plantations, processing facilities, manufacturing capability, standards, certification pathways and market confidence needed to establish a competitive domestic industry. Realising the opportunity will require coordinated action by industry, government, researchers and investors.

Bamboo Breakthrough: The Next Frontier 2026–2035 is the industry's response.

¹ Deloitte Access Economics, 2026.

Building on the findings of Deloitte Access Economics and informed by Australian and international expertise, this roadmap sets out the practical actions needed over the next decade to establish an Australian engineered bamboo industry.

We have revised the targets in our roadmap to align with Deloitte's findings, which suggest a measured pathway to 2035 is required to build the foundations for a competitive domestic industry. This roadmap provides a coordinated pathway to overcome the barriers identified in the modelling, accelerate industry development and position engineered bamboo as part of Australia's low-carbon construction future.

1.1. Room to Grow: Key Insights

Deloitte Access Economics' *Room to Grow: The engineered bamboo opportunity in Australia* makes 10 key findings.

The modelling presents a range of possible industry development scenarios rather than forecasts. Economic impacts are conditional on different rates of market adoption and on the industry overcoming barriers to growth by 2035.

1. Engineered bamboo is a viable low-carbon building material for Australia

Engineered bamboo combines fast-growing, renewable feedstock with structural performance comparable to conventional building materials. It is already widely used in Asia, especially India and China, with smaller established markets in the US and Europe. It has the potential to support building-sector decarbonisation, diversify material supply and support regional industrial development.

2. Several states are well-placed to participate in early market development

The Mid North Coast and Northern NSW combine suitable growing conditions, existing timber-industry capability and proximity to major construction markets. Queensland also offers strong growing conditions, while NSW presents a strong combination of feedstock potential, processing opportunities and market access.

3. Australia's engineered bamboo market could be worth up to \$847 million a year by 2035

Deloitte estimates an annual market opportunity of \$222 million under its low-demand scenario, \$334 million under its medium-demand scenario and \$847 million under its high-demand scenario by 2035. These scenarios correspond to annual engineered bamboo consumption of 60,000 m³, 100,000 m³ and 250,000 m³ respectively. Under the high-demand scenario, market penetration would be broadly comparable with current levels in the US and Europe.

4. Engineered bamboo could deliver sizeable emissions reductions

Under the high-demand scenario, substitution of conventional construction materials with engineered bamboo could reduce emissions by approximately 430,000 tonnes of CO₂e in 2035. This represents around 1.5% of Australia's current upfront embodied built-environment emissions, or the equivalent of removing around 170,000 cars from the road. Most of the modelled abatement comes from substituting conventional timber products, with additional opportunities in selected steel, aluminium and plastic applications.

5. Economic benefits could include around 1,800 jobs

Under the high-growth scenario, the industry could contribute approximately \$906 million to national gross domestic product (GDP) and support around 1,840 additional jobs by 2035. Economic activity would broaden over time from plantations and early-stage processing into manufacturing, construction and supporting services.

6. Most economic value would be created downstream

While plantations provide the feedstock, Deloitte finds that most economic value is created once bamboo is processed into engineered products and used in construction. Under the high-growth scenario, Deloitte estimates net additional employment of around 1,840 jobs across the Australian economy. This includes around 1,440 jobs in bamboo manufacturing and 495 jobs in plantations, alongside employment impacts elsewhere in the economy. The construction sector is also a major beneficiary, with an average increase in gross value added of approximately \$111 million a year.

7. The central challenge is establishing an investable, coordinated value chain

Australia does not currently have an integrated system to grow, process, manufacture, certify and supply engineered bamboo at scale. Investment in one part of the value chain depends on progress elsewhere: growers need future demand, manufacturers need sufficient throughput and customers need confidence in cost, performance, compliance and delivery. These interdependencies can increase perceived risk for investors, and addressing this requires a holistic policy approach.

8. Policy, standards and certification pathways must align

Existing frameworks largely reflect established construction materials. Engineered bamboo therefore faces additional hurdles in investment, testing, certification, carbon accounting and demonstration, while the absence of standardised approval pathways adds cost and complexity.

9. High growth requires a shift from niche to repeatable commercial use

Early applications are likely to be small-scale or bespoke. Reaching the high-growth scenario will require repeatable, standardised applications and greater confidence among designers, builders, certifiers and clients that engineered bamboo can consistently meet performance, compliance, cost and delivery requirements.

10. Early action could unlock industry development over the next decade

Deloitte identifies a staged pathway: near-term action to validate priority uses and reduce investment risk; medium-term action to establish repeatable products, processing capability and anchor demand; and longer-term action to expand plantations, manufacturing throughput and broader market adoption.

1.2. Why Engineered Bamboo?

Engineered bamboo combines the advantages of a rapidly renewable agricultural crop with the performance characteristics required for modern construction.

Bamboo is a giant perennial grass, not a tree. More than 1,600 species are recorded globally, with widely varying growth characteristics. Three species are native to Australia: *Bambusa arnhemica*, *Mullerochloa moreheadiana* and *Neololeba atra*.

Bamboo species fall broadly into two growth types:

- **Clumping bamboo** grows in contained clusters from short rhizomes and is generally considered non-invasive, making it the preferred choice for commercial plantations (see Figure 1). More than two thirds of bamboo species are clumping varieties. They are most commonly found in tropical and subtropical environments and can be intercropped with timber and other species.
- **Running bamboo** spreads horizontally through its rhizome system, producing more dispersed culms. Some running varieties can become invasive and are restricted in parts of Australia. They are more commonly associated with cool temperate climates, although this varies by species.

For structural bamboo production, carefully selected clumping species offer several advantages:

- **Rapid regeneration:** Bamboo matures quickly and can then be selectively harvested annually. In the clumping species proposed for Australia, culms are typically ready for structural use in around five years – generally a four-to-six-year window depending on species variety. New culms regenerate from the living rhizome system without replanting.
- **Continuous production:** This growth cycle can deliver around 25 harvests over 30 years, compared with a single timber harvest over the same period.
- **Carbon and land benefits:** A review of 184 studies found that bamboo forests are “efficient and effective carbon sinks”.² Mature bamboo ecosystems can store between 94 and 392 tonnes of carbon per hectare, although results vary considerably by species, climate, soil and management. Bamboo plantations also support soil restoration and biodiversity.
- **Established cultivation:** More than 200 bamboo species have been grown successfully in Queensland over the past 30 years, demonstrating the potential for a local industry.

Structural engineered bamboo has been proven globally as a strong, versatile material capable of replacing or complementing timber. It can be manufactured into beams, panels, flooring, cladding and other building products for residential, commercial and public infrastructure (see Figure 2).

Engineered bamboo’s value lies not in any single attribute, but in their combination. Few materials offer rapid renewability, strong structural performance, carbon storage, land restoration benefits and the potential to support a new domestic manufacturing industry.

² Yuen, J., et al, 2017.

For Australia, engineered bamboo is a scalable solution to housing, climate and economic challenges.

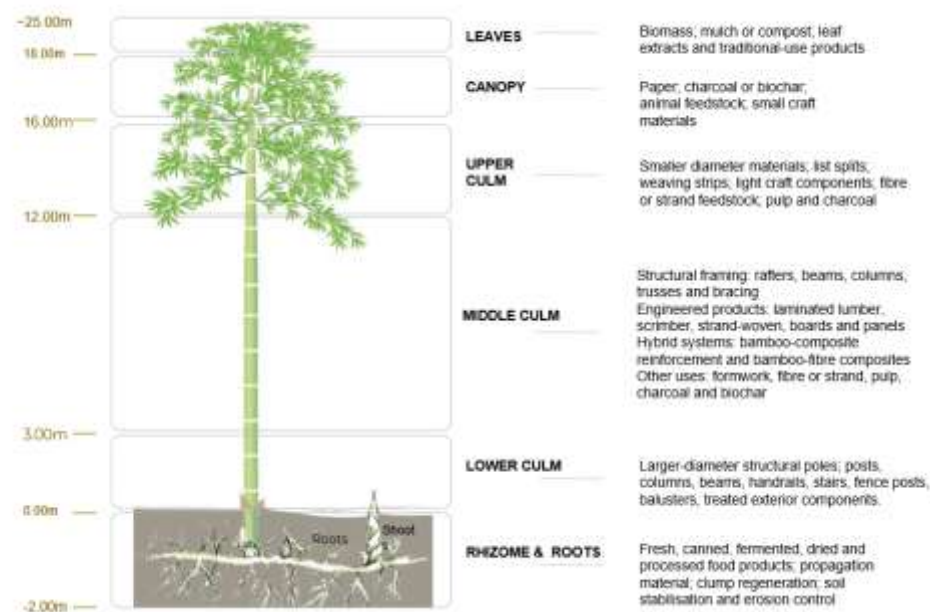


Figure 1: Clumping bamboo anatomy and potential uses, House of Bamboo, 2026.



Figure 2: From culm to engineered bamboo product, House of Bamboo, 2026.

1.3. Key Bamboo Plantation Characteristics

	Perennial crop: Clumping varieties of bamboo mature in around five years and can then be harvested annually, producing a continuous yield. Unlike trees that are felled and replanted, bamboo is harvested above ground, like fruit. Its rhizome and root system remains intact, regenerating new culms year after year while locking carbon in the soil, protecting biodiversity and preventing erosion.
	Rapid regeneration: New shoots emerge each year after harvest, creating a continuous, renewable resource supply.
	Controlled growth and intercropping: Bamboo species have different growth characteristics. Carefully-selected clumping varieties grow in contained clusters and expand more gradually. Clumping species are suitable for controlled commercial cultivation and can be intercropped with other crops as part of mixed agricultural systems.
	Soil health and erosion control: The dense network of bamboo roots helps bind soil together, reducing erosion and runoff, especially on slopes and degraded lands. This helps maintain soil fertility, stabilise land and reduce sedimentation in water bodies.
	Climate change adaptation: Selected bamboo species can tolerate dry periods once established, particularly on deep, well-drained soils, but drought performance varies widely by species, climate and management. Well-sited plantations can also sequester carbon at a high rate.
	Land restoration: Appropriate bamboo species can grow in harsh conditions, helping restore soil health, improve biodiversity and, in some circumstances, assist with phytoremediation.
	Water management: Water demand is highest in the first three to five years. Once established, many species can withstand short dry spells, and plantations can improve infiltration, slow runoff and support groundwater recharge and flood buffering. Some species also help bind and clean soils and water, but this is not true of all bamboo or all sites.
	Diverse applications: Bamboo's versatility in construction, interiors, furniture, textiles and other industries provides a sustainable, low-emissions alternative to materials with a higher environmental impact. The strength of structural engineered bamboo aligns with performance-based building codes, offering a low-carbon alternative to traditional timber and steel.
	Fire performance: Engineered bamboo products can perform similarly to dense hardwoods and demonstrate good fire performance, with appropriate testing and design supporting their use in structural applications, while managed bamboo plantations are generally more fire-resilient and recover faster than many tree plantations.

1.4. Market Context

Engineered bamboo has the potential to contribute to three of Australia’s long-term challenges: decarbonisation, housing and sovereign manufacturing.

Decarbonisation

As a signatory to the Paris Agreement, Australia has set an ambitious emissions reduction target of 62-70% below 2005 levels by 2035.³

Construction materials account for a significant share of Australia’s carbon emissions. Infrastructure Australia estimates that embodied carbon from building activity contributed 10% of national carbon emissions in 2023, with ‘upfront carbon’ contributing 7%, primarily from the manufacture of construction materials.⁴

The Australian Sustainable Built Environment Council’s report, *Our Upfront Opportunity* (2025), estimates that achieving Australia’s net-zero commitments will require a reduction of at least 60% in embodied-carbon emissions from the built environment by 2035.⁵

As governments, investors and developers pursue lower-emissions buildings, demand is increasing for renewable materials that can store carbon while delivering the structural performance required for modern construction.

“Bio-based materials may represent our best hope for radical decarbonisation through the responsible management of carbon cycles. The shift towards properly managed bio-based materials could lead to compounded emission savings in the sector of up to 40% by 2060 in many regions.”

United Nations Environment Programme,
Building Materials and the Climate: Constructing a New Future

³ Australian Government, Built Environment Sector Plan, 2025.

⁴ Infrastructure Australia, 2024.

⁵ Australian Sustainable Built Environment Council, 2025.

Housing

Australia is grappling with a housing crisis, with demand for an average of 225,400 new dwellings each year until 2034 exacerbated by timber costs that have risen by around 30% since 2020.⁶ Forest and Wood Products' More Houses Sooner report (2025) notes that Australia imports up to 40% of its timber during peak periods, straining supply chains and increasing vulnerability to global price fluctuations.

Currently, there is no local plantation supply for engineered bamboo, with all products imported. Bamboo's transformative potential has been overlooked in national policy documents, including federal government's *Australia's Circular Economy Framework* (2024)⁷ and the *National Forest Industries Plan* (2021),⁸ and the Carbon for Nature (2025) 10-year roadmap published by the Carbon Market Institute.⁹ It is also missing from Australian Climate and Biodiversity Foundation's report, *Challenges and Opportunities for the Forest and Wood Product Industry* (2025).¹⁰

Engineered bamboo is briefly acknowledged in Frontier Economics' *Forestry transition and regional employment* (2024) report, commissioned by WWF. It notes bamboo as a promising low-carbon building material that can complement timber, reduce pressure on domestic fibre supply and support the decarbonisation of Australia's construction sector.¹¹

“The need for Australia to end native forest logging is long overdue, and in order for the nation to meet its timber supply needs, the Australian Government and its state governments need to support the diversification of its fibre supply.

That means supporting the establishment of a bamboo industry – supporting growers, processors and builders, investing in the supply chain's infrastructure to incentivise private investment as quickly as possible.”

Tanya Pritchard, Head of Regenerative Country, WWF-Australia.

Sovereign manufacturing

The Australian Government's Future Made in Australia agenda seeks to strengthen domestic manufacturing capability, create regional employment, and build more resilient supply chains by investing in industries that leverage Australia's natural advantages.

⁶ Forest and Wood Products Australia, 2025.

⁷ Australian Government, *Australia's Circular Economy Framework*, 2025.

⁸ Australian Government, *National Forest Industries Plan*, 2021.

⁹ Carbon Market Institute, 2025.

¹⁰ Australian Climate and Biodiversity Foundation, 2025.

¹¹ Frontier Economics, 2024.

The Deloitte Access Economics report underscores this opportunity, finding that the greatest economic value is created when bamboo is processed into engineered construction products, rather than exported as raw or minimally processed material. Developing domestic processing and advanced manufacturing capability will therefore be critical to maximising the industry's economic contribution.

An Australian-engineered bamboo industry would create new value chains spanning plantation agriculture, processing, and advanced manufacturing. In doing so, it would support regional jobs, retain more value within Australia and reduce reliance on imported construction materials.

Australia's *Timber Fibre Strategy* (2025) projects a population of 34 to 40 million by 2050, with new housing demand of 259,000 dwellings per year and a sawn softwood demand of 6.5 million cubic metres annually.¹² This is 40% above the projected domestic softwood supply of 4.6 million cubic metres. While the strategy focuses on expanding traditional timber production, it overlooks engineered bamboo as a rapid-growth, low-carbon alternative that can complement timber to meet this shortfall.

Regions undergoing agricultural transition, following the decline of the sugarcane industry, present prime opportunities for bamboo in Queensland and northern New South Wales.

In Far North Queensland, following the closure of the Mossman Sugar Mill, growers are trialling bana grass, rice, horticulture and rainforest restoration on around 400 hectares. Government subsidies of A\$6 million support diversification, making bamboo ideal for soil restoration and new industries.¹³

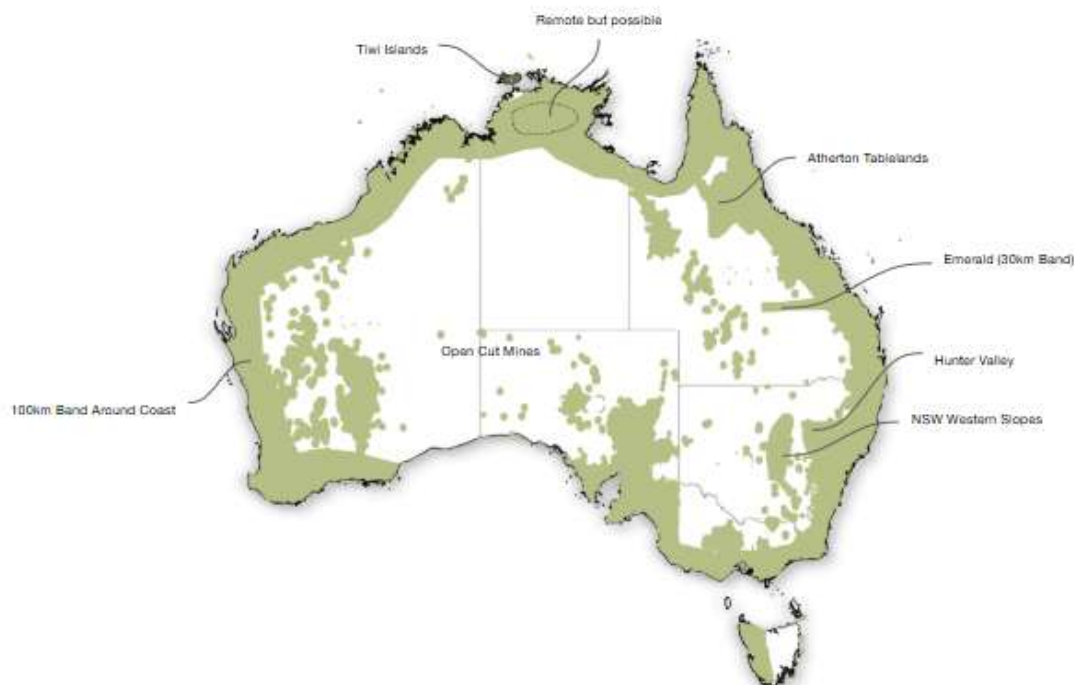


Figure 3: Potential bamboo plantations in Australia, Australian Bamboo Plantations, 2026.

¹² Australian Government, *Timber Fibre Strategy*, 2025.

¹³ Queensland Government, 2026.

2. Roadmap

The roadmap spans 2026-2035, structured across five distinct phases to guide the development and adoption of structural engineered bamboo as a transformative agricultural crop for construction, starting from a baseline of establishing local plantations on degraded lands.

The roadmap seeks to balance sustainability, local production establishment and economic impact, addressing national priorities while fostering innovation and resilience, through six core themes:

1. Investment & Market Development
2. Standards & Certification
3. Policy Advocacy & Stakeholder Engagement
4. Technology Development
5. Planting, Harvesting & Processing
6. Carbon Recognition.



Figure 4: 10-year roadmap summary, Bamboo Society of Australia, 2025.

2.1 Investment & Market Development

The strategy centres on securing funding and establishing market channels for engineered bamboo in Australia. Key steps include conducting feasibility studies to attract investment for plantations, developing robust business plans, and creating strong branding for local bamboo products.

The initial market focus is on prefabricated housing, using pilot projects to prove the concept. The long-term goal is for the industry to contribute to GDP through domestic sales and exports, leveraging partnerships with timber mills to share processing capabilities. This approach aims to align with the Future Made in Australia strategy by demonstrating a strong economic case, delivering high returns, creating jobs and boosting regional economies as the sector expands.

Global context

The global engineered bamboo market is forecast to grow from US\$27.6 billion in 2025 to around US\$44.9 billion by 2035.¹⁴ This growth is driven by rising demand for sustainable materials, supportive government policies and advances in bamboo processing technology.

The Asia-Pacific region accounted for 58% of the global market in 2023, driven largely by China.¹⁵

Potential for Commonwealth Agency Investment in Engineered Bamboo

Five Commonwealth agencies can drive local engineered bamboo production for use in housing, infrastructure, economic transformation, and agricultural resilience:

1. **Housing Australia:** Can promote engineered bamboo to lower import reliance and help meet sustainable housing targets.
2. **National Reconstruction Fund Corporation (NRFC):** Can signal investment in engineered bamboo by 2035 to diversify industry, open export markets and create jobs consistent with Future Made in Australia goals.
3. **Northern Australia Infrastructure Facility (NAIF):** Can fund bamboo plantations on degraded land, encouraging private investment and regional growth, as bamboo's drought tolerance aids climate resilience.
4. **Regional Investment Corporation (RIC):** Can finance large-scale plantations by 2035, enhancing rural jobs, land restoration and complementing the timber sector.
5. **Clean Energy Finance Corporation (CEFC):** Can extend investments to bamboo, supporting carbon capture, plantation growth and partnerships with First Nations.

¹⁴ Future Market Insights, 2025.

¹⁵ Future Market Insights, 2025.

Private Sector-Led Funding

The private sector can drive the engineered bamboo market by attracting global investment, especially by addressing gaps in Australia's Sustainable Finance Taxonomy (June 2025).

The taxonomy, based on the EU model, provides guidance for decarbonisation investments supporting Paris Agreement targets. Bamboo benefits both the "Agriculture and Land" sector via carbon storage and the "Construction and Buildings" sector by replacing high-emission materials. International frameworks, such as the EU Taxonomy and China's Green Bond Catalogue, already recognise bamboo's role in sustainability and carbon markets, reinforcing the case for immediate inclusion in Australia's taxonomy.

Including bamboo in ASFI's Taxonomy would legitimise it as a sustainable asset class, attract capital and support a circular and regenerative industry with significant effects on carbon markets and forestry. This potential extends beyond 2035, leveraging existing soil carbon methodologies and new methods like the Bamboo Forest Carbon Quantification (BFCQ).

Private sector investment opportunities include:

- **Corporations/Fortune 500:** Corporations may consider funding plantations, reducing timber imports, expanding exports and linking investments to carbon sequestration initiatives.
- **Fund managers:** Green investment funds can allocate capital towards bamboo as a resilient, long-term asset that aligns with international standards.
- **Rural portfolios:** Financing bamboo cultivation on non-arable land enhances regional resilience and job creation while offering low-risk returns.
- **Mine owners:** Bamboo plantations present opportunities for the rehabilitation of former mine sites.
- **Superannuation funds:** Large-scale financing of bamboo supports ethical returns, affordable housing projects and progress toward net-zero transitions.
- **Carbon investors:** Australian Carbon Credit Unit (ACCU) managers and international investors can utilise bamboo's rapid growth for tradable carbon credits, subject to its inclusion in approved carbon methodologies.
- **Private equity:** Investment in engineered bamboo processing yields productive returns, with classification under sustainable taxonomy contributing to reduced investment risk.
- **Philanthropy:** Impact investments in bamboo plantations and engineered bamboo construction can generate considerable carbon reductions and social value.

Case Study

Rizome, with Fortune 500 backing, has set a vision to maximise bamboo's planetary impact by 2040 with plantations in subtropical Florida and the Philippines.

The US\$100 million investment in the Philippines is central to Rizome's goal to plant 10 million bamboo clumps by 2030, removing 26 million tonnes of carbon dioxide from the atmosphere.



Recommendations

- Establish a targeted engagement program for Commonwealth agencies, institutional investors, superannuation funds, private equity, philanthropy and carbon-market participants to build awareness of engineered bamboo as an investable, regenerative asset class.
- Prepare a national investment prospectus that consolidates regional plantation opportunities, processing pathways, carbon benefits and potential government financing mechanisms.
- Develop a coordinated advocacy campaign to seek recognition of bamboo within sustainable finance, housing, manufacturing, regional development and carbon policy frameworks.
- Prioritise early commercial partnerships with prefabricated housing providers, framing processors, growers and major developers to create clear demand signals before domestic harvests begin.

Milestones

- **Phase 1: Foundations & Feasibility (2026–2028):** Complete investor and agency consultation, publish the investment prospectus, identify priority funding pathways and secure seed funding for feasibility studies, pilot plantations and demonstration projects.
- **Phase 2: Technology Integration & Small-Scale Operations (2028–2029):** Establish early anchor partnerships with growers, processors, prefabricated housing providers and institutional investors; confirm early offtake pathways and financing structures.
- **Phase 3: Market & Operational Scaling (2030–2031):** Convert pilot outcomes into commercial investment readiness, build distribution channels and strengthen demand signals for domestic product launch.
- **Phase 4: Harvest & Commercialisation (2032–2033):** Support domestic product launch, expand financing for processing and manufacturing, and embed engineered bamboo in procurement and sustainable finance pathways.
- **Phase 5: Expansion & Innovation (2034–2035 and beyond):** Scale investment into plantations, processing, exports and carbon-linked revenue streams as the industry matures.

2.2 Standards, Testing & Certification

Introduction

To establish bamboo as a trusted and viable industry in Australia, standards, testing requirements and certification frameworks must be developed. These will support mainstream adoption, building on Australia's performance-based code and international precedents as adopted by mass engineered timber. Strengthening national engagement in international standardisation efforts also presents a strategic opportunity to support this goal.

Timeline for Standards Adoption

The 10-year roadmap identifies the pathway to develop Australian standards for engineered bamboo (2026-2035) to ensure it complements timber, supporting building industry needs and local competitiveness as production transitions from imported reliance to local supply.

The initial five years (2026-2030) will use a performance-based approach to demonstrate compliance with the National Construction Code. Pilot projects using imported engineered bamboo products will be validated by accredited certification bodies (see ICC-ES case study) using international standards and/or acceptance criteria, mirroring the approach adopted by mass engineered timber. Refer to timeline below (full-size versions are available at Appendix E).

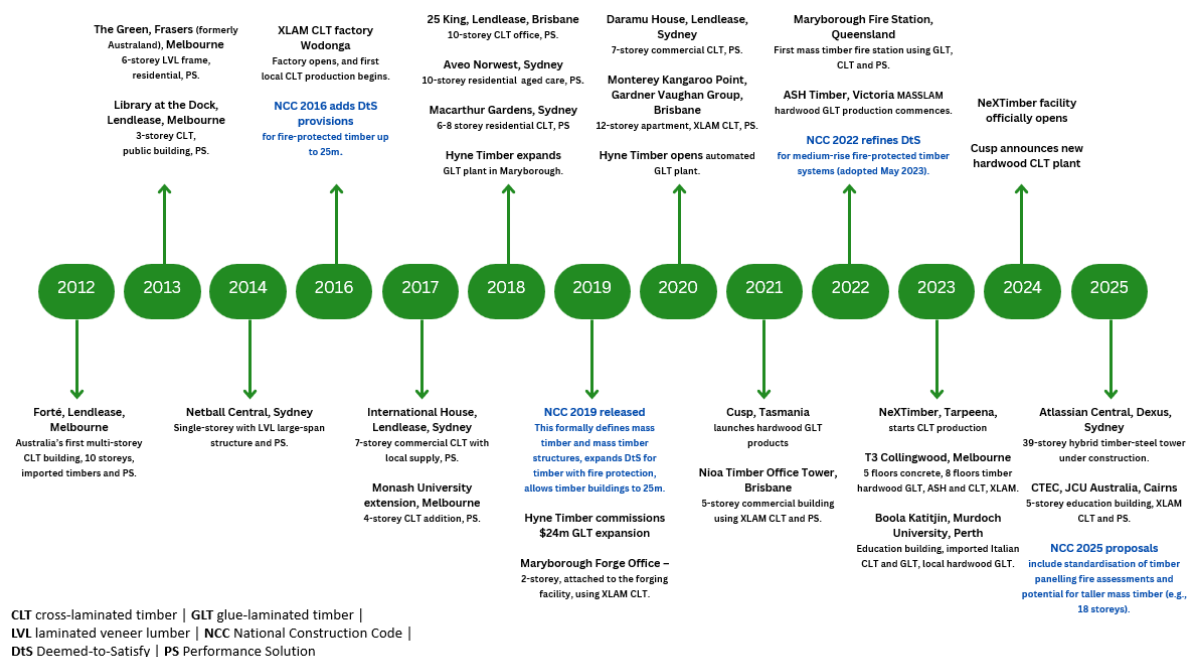
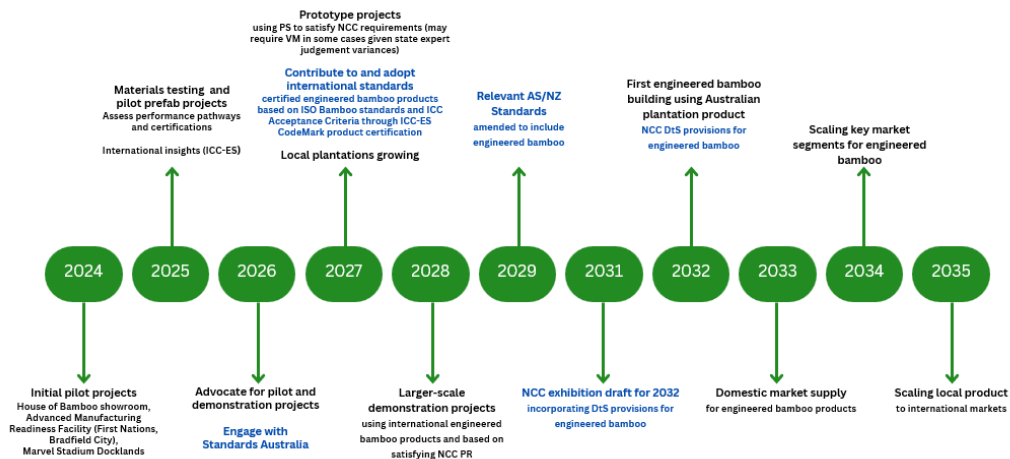


Figure 5: Mass and engineered timber timeline:2012-2025, Mansfield Advisory, 2026.

Structural bamboo is already the subject of an International Code Council Acceptance Criteria (AC162). This is the equivalent of a technical specification that can be used to evaluate engineered bamboo and demonstrate compliance with the National Construction Code either through CodeMark Australia or the use of an evaluation service report.

From 2031-2035, the focus will shift to validating data from locally grown engineered bamboo, with a gradual transition to “deemed-to-satisfy” (DtS) provisions in the NCC by 2035 or beyond. Aligning with Australian building safety standards will accelerate market acceptance and ensure quality as the domestic industry matures. Refer to the projected engineered bamboo timeline below (full-size version at Appendix E).



DtS Deemed-to-Satisfy | ICC International Code Council | ICC-ES International Code Council Evaluation Service
ISO International Organization for Standardization | NCC National Construction Code
PS Performance Solution | PR Performance Requirement | VM Verification Method

Figure 6: Engineered bamboo projected timeline: 2024- 2035, Mansfield Advisory, 2026.

Standards Development

Australia can contribute to the development of bamboo-related standards by increasing our participation in relevant International Organization for Standardization (ISO) working groups such as Standards Australia's Technical Committee on Engineered Timber Products. This would also encourage local experts to engage with ISO processes, influence global standards, build domestic expertise, and develop local solutions. Refer to International Bamboo standards in Appendix D.

“The challenge is making standards future-proof and responsive to innovations. Co-design brings experts, regulators and communities together to build fair, lasting solutions that create equitable pathways for large-scale adoption.”

Carlita Warren, Head of Engagement, Standards Australia

This approach also supports the potential to adopt international standards, whether modified or adopted identically, aligning with the priorities outlined in the 10-year roadmap and enhancing the bamboo industry's future readiness in Australia.

Product Certification Case Study: Enabling Engineered Bamboo in Australian Buildings

Engineered Bamboo currently lacks a Deemed to Satisfy Provision (DTSP) in Australia's National Construction Code (NCC). However, the Code's performance-based framework allows its use through alternative compliance pathways, provided the material is shown to be fit for purpose and meet the relevant Performance Requirements, including fire safety.

NCC A5 sets out the evidence needed to demonstrate that a material or product is suitable for its intended use in structural elements like beams, joists and columns.

Under clause A5G3, that evidence can include CodeMark Australia certification or certificates issued by a Joint Accreditation System of Australia and New Zealand (JASANZ)-accredited body. These certificates must confirm that a material's properties and performance satisfy the applicable NCC requirements.

For engineered bamboo, international test data and evaluation reports can be used as supporting evidence for an NCC Performance Solution. But they do not, on their own, establish compliance. Their relevance to the proposed use in Australia must still be demonstrated against the relevant Performance Requirements using the NCC Assessment Methods. Where that evaluation is taken through CodeMark Australia or another JASANZ-accredited certification process, the certificate itself becomes evidence of suitability under A5G3.

The International Code Council Evaluation Service (ICC-ES) is one of the bodies that can supply that technical foundation. It has a long record of assessing innovative building products, is accredited for CodeMark Australia and operates its own ES Mark Scheme.

ICC-ES Acceptance Criteria such as AC162 for Structural Bamboo and AC47 for Structural Wood-Based Products set out how products are tested and evaluated. AC47 draws on ASTM D5456 for structural composite lumber, a specification that can include bamboo as a fibre. This provides a recognised method for assessing engineered bamboo where the NCC has no Deemed-to-Satisfy pathway.

ICC-ES Evaluation Service Reports (ESRs) apply those criteria to particular products, usually against the International Building Code (IBC). They are not NCC certificates but can reduce the work needed to assemble an Australian evidence package. ESR-4781, for example, evaluates laminated bamboo strand lumber (LBSL) as an alternative to sawn lumber for lightweight structural applications such as beams, headers, joists and rafters, using ASTM D5456 and AC47. Other reports under AC162 deal with structural bamboo members.

In Australia, these reports can support a Performance Solution or feed into a CodeMark Australia evaluation, once their methods, limitations and design values are shown to be suitable for the proposed application and assessed against the relevant NCC Performance Requirements.

The same body of work sits alongside the ISO bamboo structures series. ISO 19624:2018 sets out principles and procedures for grading bamboo culms for structural use. Complementary ISO work on engineered bamboo products, including test methods in ISO 23478 and ISO 5257, is building a consistent basis for mechanical properties. Australian participation in the work for these standards helps align overseas evaluation data with the evidence needed under the NCC.

The approach mirrors mass engineered timber: a recognised overseas evaluation system supplies the test methods and product data; Australian practitioners still have to satisfy themselves that the evidence meets the requirements of the NCC for the intended use. Used this way, ICC-ES criteria, ISO methods and test reports, under the umbrella of an accredited and independent third-party certification, give engineered bamboo a practical route into beams, flooring and related structural elements without treating an overseas report as a substitute for Australian compliance.

Forest and Plantation Certification

Responsible plantation certification ensures bamboo plantations are grown and managed in a sustainable and accountable manner. There are two schemes currently operating in Australia: the Forest Stewardship Council (FSC) and the Programme for the Endorsement of Forest Certification (PEFC), recognised through the Responsible Wood Certification Scheme. Both schemes can be applied to bamboo grown in natural forests or cultivated plantations, providing assurance that environmental, social and management standards are met. Refer Appendix D for further details.

Life Cycle Assessments & Environmental Product Declarations

Life Cycle Assessments (LCAs) and Environmental Product Declarations (EPDs) are vital for the adoption of structural engineered bamboo. LCAs track a product's environmental impact from creation to disposal, while EPDs present this data in a standardised, verified format for comparison. These tools help benchmark engineered bamboo against traditional materials like concrete, steel and timber.

LCAs and EPDs are playing a bigger role in construction, and are now often required by rating tools, building codes and procurement programs targeting low-carbon materials. Without these assessments, engineered bamboo cannot be used on projects seeking net-zero or carbon reduction targets.

Existing LCA standards undervalue bamboo's rapid regrowth due to static methods. Moving to dynamic accounting methods is needed to fully recognise engineered bamboo's climate benefits. (See Section 2.4 for more on dynamic LCA.)

Recommendations

- Partner with Standards Australia for early co-design, leveraging local ISO expertise
- Consider developing industry standard, using international standards (ICC-ES)
- Subsidise accreditation costs for small innovators to accelerate Phase 2-3 progress
- Use pilots and demonstration projects to build case studies, supporting Phase 3-4 standardisation
- Integrate local challenges (such as termites or bushfire risk) into certification processes from Phase 2 onward.

Milestones

- **Phase 1: Foundations & Feasibility (2026–2028):** Map relevant NCC pathways, international standards and certification requirements; establish engagement with Standards Australia, ICC-ES, Responsible Wood and testing partners; commence structural, durability, fire and environmental assessment planning.
- **Phase 2: Technology Integration & Small-Scale Operations (2028–2029):** Validate imported engineered bamboo products through pilot projects, product testing, EPDs and performance-based compliance pathways.
- **Phase 3: Market & Operational Scaling (2030–2031):** Establish plantation certification pathways, draft industry guidance for Australian use and generate case studies from pilot projects.
- **Phase 4: Harvest & Commercialisation (2032–2033):** Generate local product performance data, complete LCAs and EPDs for Australian engineered bamboo, and progress product certification.
- **Phase 5: Expansion & Innovation (2034–2035 and beyond):** Support the transition toward NCC recognition, future deemed-to-satisfy provisions and new performance standards for bamboo products and building systems.

2.3 Policy, Advocacy & Stakeholder Engagement

Introduction

Collaboration with First Nations communities, non-government organisations and industry stakeholders is central to bamboo's competitive and sustainable future in Australia.

Policy advocacy, alignment with Australia's housing supply and sustainability policies, and active support from communities and governments are all essential. Overcoming current information and regulatory barriers demands coordinated efforts to unlock bamboo's full market potential and ensure its inclusion in national strategies and incentives under the Future Made in Australia initiative.

Key Actions for Advancement

- **Planting initiatives:** Focus on establishing bamboo plantations on degraded lands, such as former mine sites and farms. This approach leverages available infrastructure and funding, with bamboo's five-year growth cycle enabling early harvests and returns.
- **Policy advocacy:** Build a compelling economic and environmental case for bamboo, advocating for its formal inclusion in government policies and investment portfolios.
- **Showcase projects:** Develop pilot projects, such as bamboo plantations that incorporate wildlife corridors, to demonstrate feasibility and attract investor interest. These projects can serve as local exemplars, drawing on successful models from countries like China.
- **Collaboration:** Engage with key stakeholders – including WWF-Australia, government agencies and industry representatives – to ensure bamboo initiatives align with biodiversity, carbon reduction and economic growth objectives.

Closing Policy Gaps

Australia's major policy frameworks recognise the importance of decarbonising construction, expanding the circular economy, improving housing supply and developing new low-carbon industries. Yet fast-growing bio-based products like bamboo are notably absent from national strategic documents, including federal government's *Circular Economy Framework* (2024) and the *National Forest Industries Plan* (2021), and the *Carbon for Nature* (2025) 10-year roadmap published by the Carbon Market Institute.

This represents a policy gap rather than a material gap. Fast-growing bio-based materials offer a pathway to increase domestic manufacturing, store carbon in the built environment, diversify regional industries and expand the supply of renewable construction materials. Engineered bamboo provides a practical case study of how these opportunities could be realised in Australia.

This roadmap aims to close this policy and engagement gap by positioning engineered bamboo within Australia's broader housing, climate, circular economy and industrial development agendas, supporting its transition from an imported niche or novelty product to a locally manufactured construction material by 2035.

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Fostering First Nations Opportunities

First Nations communities bring invaluable expertise in land stewardship, making their involvement crucial to the development of a thriving engineered bamboo industry.

This roadmap is committed to fostering opportunities for First Nations empowerment, economic participation and leadership, consistent with the *National Statement on First Nations in Agriculture, Fisheries and Forestry* (endorsed by Australian agriculture ministers in 2025). The Statement underpins meaningful First Nations involvement, advancing economic inclusion, self-determination and the recognition of cultural and spiritual land management practices.

In practical terms, this approach includes co-designing plantation projects on suitable lands, guided by Free, Prior and Informed Consent (FPIC) protocols. Economic participation can involve equity stakes in bamboo plantations, job creation in harvesting and processing, and access to revenue from carbon credits. Additional opportunities include training programs and advisory roles that build skills in sustainable farming and governance. Leadership pathways can be created through First Nations-led governance or partnerships, integrating traditional knowledge to enhance biodiversity and land rehabilitation outcomes.

By addressing historical exclusions and supporting regenerative development, this roadmap seeks to position First Nations as key contributors in the engineered bamboo sector, advancing targets outlined in the *National Agreement on Closing the Gap* and promoting a shared sustainable future contingent on ongoing collaboration and consent.

Policy Advocacy and Demonstration Projects

Independent modelling from Deloitte Access Economics demonstrates the potential of an Australian engineered bamboo industry. The next challenge is translating that evidence into policy, investment and commercial confidence.

Developing showcase projects, such as pilot bamboo plantations that incorporate wildlife corridors, can provide tangible proof of concept. These demonstration projects not only illustrate the practical feasibility of bamboo cultivation at scale, but also attract investor interest. By drawing on successful models from countries like China, these projects can serve as local exemplars, showing how bamboo can be integrated into Australian landscapes while supporting biodiversity and sustainable land use.

Stakeholder Collaboration

Collaboration with key stakeholders is critical to the success of bamboo initiatives. Engaging non-government organisations, relevant government agencies and industry representatives ensures that efforts to promote bamboo align with broader objectives. This includes supporting biodiversity, contributing to carbon reduction targets and fostering economic growth. Through coordinated stakeholder engagement, it is possible to create a unified approach that maximises the positive impacts of bamboo as a sustainable resource.

Framework for Engagement

The overarching objective is to position engineered bamboo as a scalable, viable solution for Australia's construction industry by 2035. This will be accomplished by harnessing policy support and stakeholder collaboration to fill the gaps left by existing frameworks.

- **Stakeholder mapping:** This is essential to obtain the broadest possible understanding of all interested stakeholders, from growers to end users.
- **First Nations:** Partner with Traditional Custodians using FPIC protocols to integrate cultural knowledge into land use and policy, strengthening engineered bamboo's social licence.
- **Government:** Collaborate with federal and state bodies to embed engineered bamboo within housing and climate policies, especially under the Future Made in Australia incentives.
- **Non-government organisations:** Work with organisations like WWF Australia to advocate for bamboo's role in mitigating deforestation and saving native forests, and to mobilise community backing.
- **Industry:** Engage timber producers, construction firms, peak industry bodies, and suppliers to align engineered bamboo with supply chains and market needs.
- **Research institutions:** Involve universities including Deakin University, University of Sunshine Coast, RMIT, University of Technology Sydney and Griffith University to provide research and data for policy development.

Engagement with the Prefabrication Industry

Prefabrication offers one of the strongest pathways for engineered bamboo adoption.

The prefabAUS Industry Roadmap 2023–2033, *Building the Future We Want* (2024) advocates for prefabrication as a means to achieve 50–80% lower embodied carbon.¹⁶ However, its focus on timber solutions overlooks the potential of engineered bamboo, which boasts rapid regrowth and substantial carbon sequestration capabilities. To tackle this, prefabAUS and stakeholders, including government, unions and industry, will be encouraged to explore engineered bamboo in prefabricated building systems. Hybrid designs could also be explored, combining lower-grade timber with engineered bamboo to improve performance.

Advocacy Strategy

- **Policy alignment:** Advocate for engineered bamboo's inclusion in the National Construction Code (NCC) for 2032 and seek acknowledgement for carbon credit schemes.
- **Incentivise development:** Seek tax credits, grants and R&D funding to offset the costs of plantation and processing, drawing from examples of timber industry precedents.
- **Regulatory adaptation:** Learn from the phased NCC integration of mass engineered timber adoption (Performance based solutions, then Deemed to Satisfy provisions) and adopt Deemed to Satisfy provisions based on bamboo's unique mechanical characteristics.

¹⁶ PrefabAUS, 2024.

Engagement Mechanisms

- **Summits and workshops:** Build on events like The Next Frontier Summit (June 2025) by facilitating ongoing dialogues to co-design policies, share knowledge and build consensus.
- **Pilot projects:** Launch engineered bamboo pilots to demonstrate feasibility and support regulatory acceptance across a range of classes of building typologies and use cases.
- **Community outreach:** Educate community about engineered bamboo's economic and environmental benefits, ensuring broad-based, inclusive participation and awareness.

Benchmarking Approach

Insights from timber initiatives such as the Australian Forestry Industry Plan and climate policies like *Carbon For Nature* – which established initial forest management incentives – will guide future strategies. Although earlier programs emphasised prolonged growth cycles, there is a pressing requirement for updated support frameworks to realise bamboo's growth capacity and resolve regulatory shortcomings.

This roadmap stands as a first-of-its-kind initiative, requiring bespoke incentive structures and stakeholder engagement to overcome a lack of recognition and regulatory clarity.

Key Barriers and Policy Solutions

Barriers	Solutions
Policy and funding frameworks are designed around incumbent materials, limiting recognition of fast-growing bio-based materials.	Advocate for inclusion of engineered bamboo in housing, forestry, circular economy, manufacturing and climate policy.
Certification, standards and regulatory pathways remain complex, increasing the cost and uncertainty of adoption.	Progress standards, testing, certification and NCC pathways.
The industry lacks coordinated development across plantations, processing, manufacturing and market demand.	Coordinate investment and collaboration across the value chain.
Early market adoption is constrained by limited demonstration projects and procurement pathways.	Deliver showcase projects and work with government and industry to stimulate early demand.
Limited market familiarity and confidence among designers, builders, certifiers and clients.	Continue education, stakeholder engagement and dissemination of research.

Source: Adapted from Deloitte Access Economics, *Room to Grow*, 2026.

Milestones

- **Phase 1: Foundations & Feasibility (2026–2028):** Secure initial funding support, develop potential incentives and commence stakeholder consultations, policy proposals and First Nations engagement.
- **Phase 2: Technology Integration & Small-Scale Operations (2028–2029):** Implement early incentives, progress INBAR and government engagement, and expand stakeholder partnerships across research, industry and community groups.
- **Phase 3: Market & Operational Scaling (2030–2031):** Fund and promote pilot projects, build community outreach and support regulatory acceptance for early building applications.
- **Phase 4: Harvest & Commercialisation (2032–2033):** Align policy, procurement and carbon-recognition pathways with first domestic harvests and locally produced engineered bamboo products.
- **Phase 5: Expansion & Innovation (2034–2035 and beyond):** Achieve full regulatory alignment and scale policy impact, establishing bamboo as a mainstream construction material in Australia.

2.4 Research, Innovation & Technology Development

Continued research and innovation will be essential to improving productivity, reducing costs and expanding the commercial applications of engineered bamboo.

Priorities include plantation management technologies, automated harvesting, advanced manufacturing processes and the development of new construction products. Emerging technologies such as artificial intelligence, drones and robotics also have the potential to improve plantation monitoring, optimise harvesting and support more efficient production as the industry matures.

Collaboration between industry, government and research institutions will be critical to accelerating innovation and ensuring research is translated into commercial outcomes.

Appendix C outlines the proposed research agenda, including opportunities to improve productivity, strengthen carbon outcomes and expand the range of engineered bamboo products by 2035.

Recommendations

- Establish a coordinated research and innovation program focused on plantation productivity, harvesting automation, processing efficiency, product development and carbon measurement.
- Partner with universities, growers, processors, technology providers and construction industry partners to translate research into pilot projects and commercial applications.
- Prioritise AI, drone and robotics trials for plantation monitoring, yield prediction, harvesting optimisation and data collection.
- Develop and test new engineered bamboo products and hybrid systems, including residential framing, prefabricated systems, composites and commercial building applications.
- Create shared data protocols to support standards, certification, LCAs, EPDs and carbon accounting across the value chain.

Milestones

- **Phase 1: Foundations & Feasibility (2026–2028):** Map priority research needs, establish research partnerships, identify technology providers and define pilot data requirements for plantations, processing and product testing.
- **Phase 2: Technology Integration & Small-Scale Operations (2028–2029):** Trial AI, drones, robotics and processing technologies in pilot settings and establish data protocols for plantation monitoring and carbon measurement.
- **Phase 3: Market & Operational Scaling (2030–2031):** Commence product development for residential framing, prefabrication and hybrid bamboo systems, supported by pilot performance data.

- **Phase 4: Harvest & Commercialisation (2032–2033):** Translate pilot results into commercial systems, expand advanced manufacturing and publish performance data.
- **Phase 5: Expansion & Innovation (2034–2035 and beyond):** Broaden product applications, support export-ready innovation and continue R&D into next-generation engineered bamboo systems.

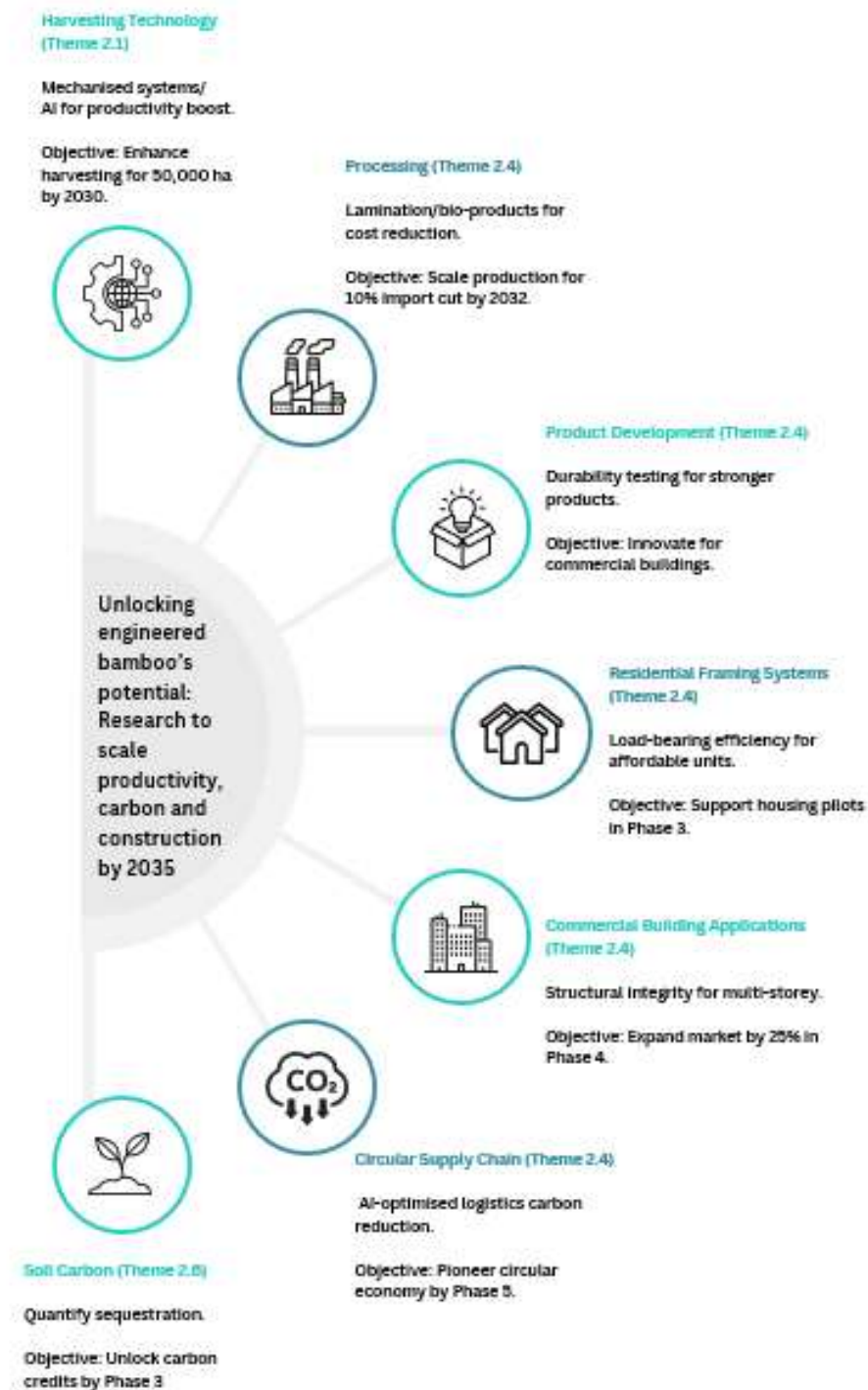


Figure 7: Research priorities for engineered bamboo, Mansfield Advisory, 2026.

2.5 Planting, Harvesting & Processing

Introduction

Australia's bamboo industry is poised for growth, with the BSA's target to establish 4,000 hectares of plantations by 2030, scaling to 20,000 hectares by 2035.

Plantation development would scale progressively from an initial 200-hectare pilot to around 20,000 hectares by 2035, sufficient to support the 250,000 cubic metres of annual production modelled in Deloitte's high-growth scenario.

Phase	Plantation scale	Indicative annual production
Phase 1	200 ha – pilot scale	2,500 m ³
Phase 2	2,000 ha	25,000 m ³
Phase 3	4,000 ha	50,000 m ³
Phase 4	8,000 ha	100,000 m ³
Phase 5	20,000 ha	250,000 m ³

Figure 8: Scaling Australia's bamboo plantations.

This expansion focuses on rehabilitating degraded land, leveraging bamboo's rapid growth, regenerative harvesting, and compatibility with existing sugarcane and timber infrastructure.

As a perennial agricultural crop, bamboo offers a sustainable alternative to long-rotation forestry, contributing to GDP through domestic production and exports. Key resources like *The Bamboo Handbook* (1999) by Durnford Dart provide essential guidance for cultivation.

Current State of Australian Bamboo Industry

Australia has a nascent bamboo industry, with around 35 commercial propagation nurseries operating across multiple states, concentrated mainly in mid to northern New South Wales and south-east Queensland. These nurseries primarily supply the retail horticulture sector – garden centres and nurseries that service home gardeners, as well as the landscaping industry.

In addition to nurseries, a small number of bamboo plantations exist across Australia. Most are small in scale, covering only a few hectares, with a handful extending to around 40 hectares. These plantations generally operate at low or idle harvesting capacity, often for small-scale or non-commercial purposes, though some supply limited quantities of bamboo poles and, in niche cases, edible shoots.

Beyond plant propagation and micro-scale harvesting, Australia relies almost entirely on imports of engineered bamboo from Asia. This material is mainly used in non-structural building applications at this stage, flooring, paper products, and a wide range of consumer goods, including kitchen décor, textiles, garden furniture and food products such as bamboo shoots.

Supply Expansion (Phases 1-2: Foundations and Technology Integration, 2026-2029)

In Phase 1 (2026-2028), feasibility studies will identify optimal regions for bamboo plantations, prioritising degraded sites such as former sugarcane areas in Queensland (e.g., Mossman) and NSW (e.g., Northern Rivers). These locations, facing yield declines due to climate variability and mill closures, are ideal for bamboo's soil restoration capabilities.

Initial pilots of 200 hectares will test clumping species, confirm non-invasive growth and align with biodiversity goals. This phase supports Investment & Market Development (2.1) by securing early funding through economic analysis that highlights bamboo's potential to reduce Australia's 40% timber import reliance and projected 40% domestic supply shortfall by 2050.

By Phase 2 (2028-2029), scaling towards 2,000 hectares will incorporate adapted forestry equipment, drawing from sugarcane infrastructure for efficient establishment. Collaboration with growers and processors will demonstrate bamboo's compatibility with existing systems, tying to Technology Development (2.4) for AI and drone integration to optimise planting. This builds a foundation for sustainable supply, aligning with the roadmap's goal of reducing reliance on imports and fostering resilient agriculture.

Sustainable Harvesting and Carbon Sequestration (Phases 3-4: Market Scaling and Commercialisation, 2030-2033)

Bamboo's annual harvest cycle after five years maturation contrasts with timber's decades-long growth cycle, enabling stable income and environmental benefits. Selective harvesting, cutting culms above roots, preserves soil structure, enhances carbon storage and supports biodiversity, avoiding the clear-felling common in forestry.

In Phase 3 (2030-2031), pilots will demonstrate zero-soil-disturbance methods, integrating with Carbon Recognition (2.6) to quantify sequestration via the Soil Carbon Method and BFCQ. This supports provisional outcomes like carbon credits, validated through Phase 1 modelling.

Phase 4 (2032-2033) introduces first domestic harvests, focusing on engineered bamboo products and projecting sequestration benefits. This phase links to Policy Advocacy (2.3), advocating for bamboo's inclusion in net-zero frameworks like the Australian Government's Built Environment Sector Plan.¹⁷

Sustainable practices will maintain habitats, while intercropping adds economic value, contributing to regional revitalisation and the roadmap's emphasis on emissions reduction.

¹⁷ Australian Government, *Built Environment Sector Plan*, 2025.

Advanced Technology and Processing (Phases 2-5: Technology Development and Expansion, 2028-2035)

Technology is key to scalability. Phase 2 incorporates AI, drones and robotics for monitoring and harvesting, partnering with universities to advance R&D. Existing sugarcane and timber facilities in Queensland and New South Wales can adapt with minimal modifications, including industrial chippers and drying units, for high-volume processing, producing engineered bamboo and hybrids like cross-laminated bamboo-timber (CLBT).

By Phase 4, new facilities near plantations will streamline supply chains, fostering innovation in composites (e.g., hemp-engineered bamboo precast or softwood-bamboo, led by the University of Technology Sydney, Deakin and Griffith universities).

Phase 5 (2034-2035) scales operations, producing around 250,000 cubic metres of engineered bamboo annually, boosting exports and tying to Investment (2.1) for GDP growth. This connects to the roadmap's innovation focus, positioning Australia as a leader in sustainable materials.

Regional Development and Economic Impact (Phases 4-5: Commercialisation and Expansion, 2032-2035)

Bamboo could revitalise regions through job creation in manufacturing, engineering and logistics. Repurposing dormant mills (e.g., Mossman) optimises infrastructure, while First Nations partnerships integrate traditional knowledge for sustainable stewardship. This supports the roadmap's social opportunity focus, creating alternate employment post-forest closures and aligning with net zero goals. Overall, it delivers economic resilience, with provisional outcomes like job growth and reduced timber imports, validated in Phase 1 modelling.

Recommendations

- Establish a national plantation and processing development program that prioritises degraded agricultural land, former sugarcane regions, mine rehabilitation sites and areas with suitable existing infrastructure.
- Undertake regional feasibility studies to identify priority planting zones, species selection, landholder partnerships, logistics requirements and processing locations.
- Develop pilot plantations that demonstrate clumping species management, zero-soil-disturbance harvesting, biodiversity outcomes and carbon measurement protocols.
- Plan early processing capacity by adapting suitable sugarcane, timber and agricultural infrastructure while designing purpose-built facilities near future plantation clusters.
- Integrate First Nations partnerships, grower training, workforce development and regional employment pathways into plantation, harvesting and processing plans.

Milestones

- **Phase 1: Foundations & Feasibility (2026–2028):** Complete regional feasibility studies, identify priority planting sites, select pilot species, secure landholder and First Nations engagement, and design pilot plantation and processing plans.
- **Phase 2: Technology Integration & Small-Scale Operations (2028–2029):** Establish and scale pilot plantations, test adapted harvesting and processing equipment, develop grower protocols and begin planning regional processing hubs.
- **Phase 3: Market & Operational Scaling (2030–2031):** Increase plantation areas, refine harvesting methods, test processing pilots and prepare supply chains for first domestic harvests.
- **Phase 4: Harvest & Commercialisation (2032–2033):** Complete first domestic harvests, commission processing facilities and support commercial production of Australian engineered bamboo products.
- **Phase 5: Expansion & Innovation (2034–2035 and beyond):** Scale plantation areas towards 20,000 hectares, supporting 250,000 cubic metres of finished product, expand processing capacity and support domestic and export market growth.

2.6 Carbon Recognition

Introduction

The engineered bamboo industry offers significant potential to support Australia's carbon reduction targets, as outlined in the Net Zero Built Environment Sector Plan (September 2025).

By harnessing bamboo's sequestration across above-ground biomass (AGB), below-ground biomass (BGB), soil organic carbon (SOC), litter, product storage and dynamic life cycle assessments (LCA), this theme aligns with roadmap objectives like policy recognition and emissions reduction. Key actions include resolving Soil Carbon Method eligibility, advancing BFCQ, and adopting dynamic LCA to reflect bamboo's rapid regrowth.

Bamboo category recognition within embodied carbon databases

Environmental Product Declarations for engineered bamboo are already available. Those declarations cover internationally supplied products now used in the Australian market and provide verified, product-specific emission factors that projects can apply today. EPD Australasia already recognises bamboo as a distinct product category, so the Australian EPD pathway is in place. Category recognition in rating tools and default-factor databases is the remaining requirement. Without it, assessors continue to map engineered bamboo to timber or to a generic biomass class, which distorts both fossil emission factors and stored biogenic carbon.

NABERS has informally confirmed it will establish an engineered bamboo category and incorporate the new EPDs into the Embodied Carbon tool and the National Material Emission Factors Database, with that work expected in 2027.

International tools have not yet followed. EC3, a widely used global embodied carbon calculator, has no bamboo category. Published bamboo EPDs are typically assigned to a wood subcategory, so projects using EC3 cannot report the material on its own terms.

Phase 1 (2026–2028) will pursue NABERS category recognition and EPD inclusion through completion, and seek equivalent treatment in other databases, tools and specifications used for design, procurement and certification, including EC3. The intended outcome is that engineered bamboo can be specified and rated as a standard material pathway, not as an exception or a timber proxy.

Soil Carbon: Inclusion of Bamboo

In July 2025, the Clean Energy Regulator (CER) advised that bamboo planting alone may not qualify under the 2021 Soil Carbon Method, possibly due to misconceptions about harvesting (bamboo uses zero-soil-disturbance selective culm removal, akin to pruning). The CER is open to clarification on baselines and criteria, creating an opportunity for an industry-wide SOC framework. This ties to Phase 1 (2026–2028) milestones, enabling early carbon credits and investor interest.

International Recognition of Bamboo

Globally, frameworks like Verra's Verified Carbon Standard (VCS) certify bamboo under Afforestation, Reforestation and Revegetation methodologies, with projects like the 7,800-plus hectare EcoPlanet project in Ghana, South Africa and Central America, and the Asia Bamboo Reforestation project in Philippines, targeting 3 million tonnes of carbon sequestration in 20 years.

Europe's Open Natural Carbon Removal Accounting (ONCRA) suits small pilots, certifying biochar and engineered products at low cost. Recent innovations include InfraBlock's digital platform, launched at Climate Week NYC 2025 in partnership with the Asian Development Bank. Using blockchain for transparency and traceability, it monitors bamboo carbon credits to scale high-integrity finance in Asia, blending technology with nature-based solutions.

The International Bamboo and Rattan Organization (INBAR) advocates for bamboo in Article 6 of the Paris Agreement, calls on the Intergovernmental Panel on Climate Change to improve land definitions (e.g., LULUCF categories in Volume 4, Chapters 4–5 and 12), and to integrate bamboo into Nationally Determined Contributions (NDCs) and carbon markets, including tools like allometric equations for biomass/product storage. These models inform Australia's approach, supporting BFCQ development in Phase 2 (2028–2029) for scalable credits.

Bamboo Forest Carbon Quantification (BFCQ)

BFCQ is a registered ACCU Scheme method idea, lodged with the Department of Climate Change, Energy, the Environment and Water on 20 June 2024 and held for a later Expression of Interest round. No EOI round is currently open. The method is intended to close a gap in Australia's carbon accounting. Bamboo stores carbon in living biomass, harvested products and soils, but it sits outside the tree-based calibrations used in the 2022 Plantation Forestry method and FullCAM.

The proposed method would take the architecture of that plantation method and recast it around bamboo's actual growth cycle. Culms typically mature in around five years and can then be selectively harvested each year without replanting. That is closer to a managed perennial crop than a conventional clear-fell rotation. Product durability and avoided emissions from substituting higher-embodied materials would be treated as separate design questions, not assumed credits.

Soil carbon is not locked in. The Periodic Review of the Soil Organic Carbon Method 2021 was made public on 29 July 2026. BFCQ will wait on that outcome, informed by local plantation data and international research, before deciding whether and how soil carbon is included. That work lines up with a later verification phase around 2030–31.

Dynamic Life Cycle Assessment (LCA) and Bamboo's Climate Impacts

Dynamic LCA evaluates carbon flows over time, better suiting bamboo's rapid regrowth than static methods. It highlights bamboo's net cooling effect within 5–10 years. Policy adoption could enhance frameworks like the Emissions Reduction Fund.

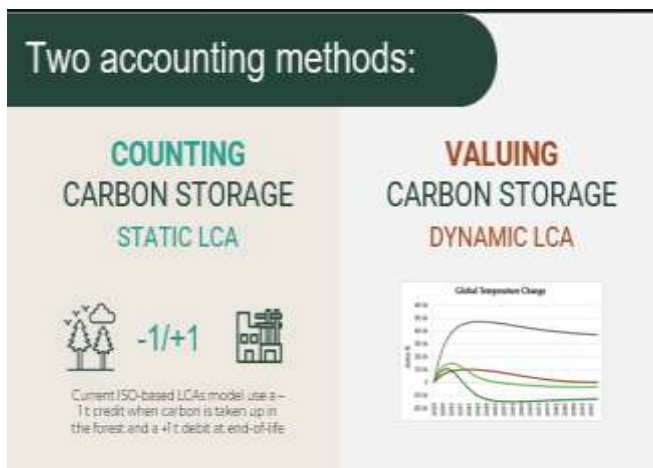


Figure 9: Two accounting methods for engineered bamboo, Isabella van der Griend, Brightworks Sustainability, June 2025.

The illustration overleaf shows the time value of carbon and how bamboo's short harvest cycle (around five years) allows for quicker sequestration and release compared to timber's longer cycles (20-50 years). The lines represent cumulative carbon storage over time, demonstrating bamboo's early net cooling advantage due to rapid regrowth, which amplifies mitigation impacts in the near term and is critical for limiting warming under the 2°C threshold.

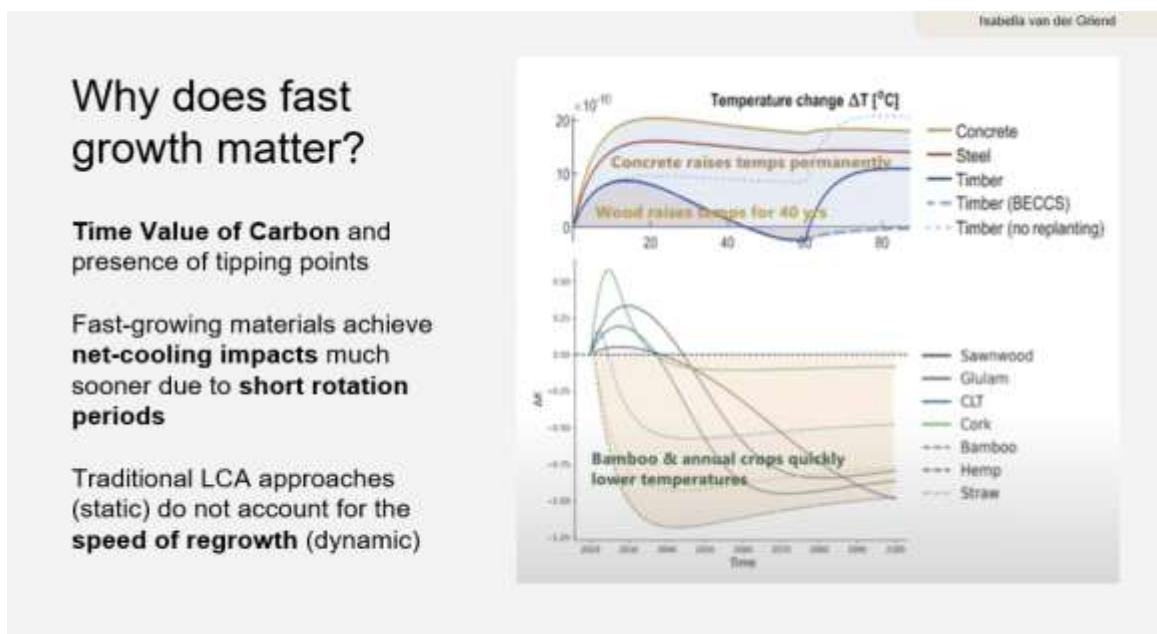


Figure 10: Time value of carbon, Isabella van der Griend, Brightworks Sustainability, June 2025.

The time value of carbon concept emphasises that early reductions in greenhouse gases are more valuable than later ones, as they prevent immediate warming and its compounding effects. For bamboo, this means faster sequestration creates greater climate benefits, supporting dynamic LCA adoption in Phase 3 to update national accounting and prioritise short-rotation crops like bamboo.

Recommendations

- Secure category recognition for engineered bamboo in embodied carbon databases and rating tools, building on published EPDs for internationally supplied products and the existing bamboo category in EPD Australasia.
- Work with NABERS to complete an engineered bamboo category and include the published EPDs in the Embodied Carbon tool and the National Material Emission Factors Database.
- Seek equivalent category treatment in other databases, tools and specifications used for design, procurement and certification, so that engineered bamboo is not mapped to timber or a generic biomass class.
- Resolve bamboo's treatment under the Soil Carbon Method by working with the Clean Energy Regulator to clarify baseline, eligibility and zero-soil-disturbance harvesting requirements.
- Advance the Bamboo Forest Carbon Quantification method so that above-ground biomass, below-ground biomass, soil carbon, product storage and avoided emissions can be recognised through credible accounting pathways.
- Develop pilot data frameworks that measure carbon flows across plantations, harvesting, processing and engineered bamboo products.
- Promote dynamic LCA as the preferred accounting approach for short-rotation crops, ensuring bamboo's rapid regrowth and near-term climate benefits are properly recognised.
- Use international networks, including INBAR and relevant carbon-market standards, to align Australian carbon recognition with emerging global practice.

Milestones

- **Phase 1: Foundations & Feasibility (2026–2028):** Clarify Soil Carbon Method eligibility with the Clean Energy Regulator, progress the BFCQ pathway and establish pilot data requirements for soil, biomass, product storage and dynamic LCA. Complete NABERS category recognition and EPD inclusion (expected 2027) and set out the case for a dedicated engineered bamboo category in other tools, including EC3.
- **Phase 2: Technology Integration & Small-Scale Operations (2028–2029):** Develop carbon measurement partnerships, collect baseline and pilot plantation data, build dynamic LCA models and align Australian work with INBAR and international carbon-market frameworks. Establish default emission factors for engineered bamboo in the National Material Emission Factors Database and pursue category listing in EC3 and other commonly used specification tools.

- **Phase 3: Market & Operational Scaling (2030–2031):** Measure sequestration changes, pilot dynamic LCA using early plantation data and prepare BFCQ for post-harvest implementation. Use the recognised engineered bamboo category as the standard pathway in NABERS ratings and project specifications, rather than a timber proxy or one-off ruling.
- **Phase 4: Harvest & Commercialisation (2032–2033):** Generate verified carbon data from first harvests, progress ACCU and BFCQ recognition, and seek regulatory acceptance of dynamic LCA. Update embodied carbon factors as first Australian-grown and processed products, and any new EPDs, come into the market.
- **Phase 5: Expansion & Innovation (2034–2035 and beyond):** Integrate carbon claims into product certification and market development, finalise dynamic LCA recognition and monitor long-term carbon outcomes. Maintain category listings and emission factors as the product set and supply chain mature.

3. Phases of the 10-Year Plan

3.1 Phase 1: Foundations & Feasibility (2026-2028) Conduct feasibility studies, secure initial funding and engage stakeholders. Pilot plantations for data collection. Use international engineered bamboo for pilots.

3.2 Phase 2: Technology Integration & Small-Scale Operations (2028-2029) Implement AI/drones, scale to plantations, develop and test harvesting technology and test processing. Establish certification agreements.

3.3 Phase 3: Market & Operational Scaling (2030-2031) Develop distribution channels, certify products and prepare for first local harvests. Focus on housing pilots.

3.4 Phase 4: Harvest & Commercialisation (2032-2033) Launch locally produced products, quantify carbon sequestration and create jobs.

3.5 Phase 5: Expansion & Innovation (2034-2035 and beyond) Expand to 250,000 cubic metres of engineered bamboo locally produced.

4.Implementation Strategy

Proposed Phase 1 Workplan – Establishing Feasibility and Foundations

Work Stages	Actions
Development of Industry Business Plan and Market Development	Develop a detailed business plan including: - Feasibility study: Whitepaper assessing the feasibility of local structural engineered bamboo production, including identification of optimal regions for bamboo cultivation and specific target areas for pilot plantation - Join INBAR to access resources - Economic analysis: Economic impact analysis to understand the potential of the engineered bamboo industry on Australian economy, including job creation, regional economic benefits, and overall investment attractiveness - Industry business plans and financial modelling for production including plantations, harvesting and processing - Analysis of market potential: Evaluate the existing wood product market, growth potential and market opportunities for engineered bamboo - Market entry strategy: Determine how engineered bamboo will gain market share, and identify the initial target markets ('beachhead markets').
Start Up Investment	- Map and prioritise potential funding sources for the industry - Prepare investment pitches to attract funding and develop comprehensive funding plans - Secure initial funding: Engage with priority funding groups to seek ongoing funding.
Standards and Certification	Establish credible industry and construction standards by: - Identifying relevant codes, standards, regulations and potential policy barriers and opportunities with Standards Australia - Developing industry standard (as an option), using international standards (ICC-ES) - Environmental Product Declarations (EPDs) for international products - Engaging with Responsible Wood - TM11 Engineered Timber Standard engagement (Establishing dedicated bamboo working group with Standards Australia) - Engaging with QLD DAF on durability testing of engineered bamboo - Completing structure and fire testing on engineered bamboo.
Policy Advocacy and Stakeholder Engagement	Build relevance and influence of bamboo industry by: - Completing a stakeholder map to identify priority stakeholders - Developing tailored objectives and communication points for each priority stakeholder group - Initiating dialogue with: - o Government departments and agencies, including agriculture, environment, industry and science, including CSIRO - o Research institutions including universities, cooperative research centres (CRCs) and Australian Research Council (ARC) partnerships - o Environmental and other not-for-profits, including WWF-Australia - o Industry and professional associations including National Farmers' Federation (NFF), Natural Resource Management (NRM) and CANEGROWERS - o First Nations representatives - o AgriFutures, Clean Energy Finance Corporation (CEFC), National Reconstruction Fund Corporation (NRFC), Northern Australia Infrastructure Facility (NAIF) and Regional Investment Corporation (RIC).
Technology Development	Map new and existing technologies to each part of the business plan, including: - The applicability of AI, drones and robotics in plantations and plan and secure relevant technologies to run in the pilot plantation - Measurement and reporting of carbon sequestration from each harvest - Review data collection and reporting requirements, including regulatory reporting.

Plantation, Processing and Harvesting	Develop an action plan to plant, harvest and process a pilot plantation including: - Assessment of current plantations (most currently used for bamboo shoots) - Potential pilot options - Review of trials and selection of pilot bamboo species - Definition of management practices to maximise environmental benefits, focusing on carbon sequestration, biodiversity and community engagement.
Carbon Recognition	- Bamboo category recognition within embodied carbon databases - Dynamic life cycle assessment - Initiate consensus-building with researchers (e.g., Deakin University), policymakers, and industry (e.g., INBAR) to define the role of dynamic LCA for short-rotation crops, exploring pilot data collection frameworks - Review and develop action plans for priority opportunities in carbon credit schemes in Australia and internationally.

5. Conclusion

This roadmap positions Australia as a leader in bio-based innovation through a phased approach that moves from pilots and standards to industry expansion.

By 2035, it sets out a pathway to establish the domestic agricultural and manufacturing capability to produce 250,000 cubic metres of engineered bamboo annually.

The work ahead is substantial and will require coordinated effort from government, industry, researchers and investors to realise engineered bamboo's potential.

Now is the time to act. Join the Bamboo Society of Australia at bamboo.org.au to help shape Australia's next generation of sustainable building materials.

"We've built with engineered bamboo overseas. It works. Australia just needs the will to test it here."

Matt Burke, Ironwood Engineers

Appendix A: The Next Frontier Summit

In June 2025, the Bamboo Society of Australia convened the inaugural Bamboo Summit in three cities: Brisbane, Sydney, and Melbourne. The three-day program brought together international bamboo pioneers, Australian researchers, architects, policymakers, standards bodies and investors.

The first-of-its-kind Summit marked a turning point: it demonstrated broad cross-sector interest in developing an Australian engineered bamboo industry and helped inform the roadmap presented in this report.



Global Perspectives

International speakers shared projects and research demonstrating that structural engineered bamboo is already being used in commercial buildings and public infrastructure overseas. Presentations included:

- **Neil Thomas MBE** (Atelier One, UK), who explored the design opportunities offered by engineered bamboo.
- **Professor Yan Xiao** (Zhejiang University, China), whose research includes the world's first multi-storey engineered bamboo building and decades of structural testing.
- **David Sands** (Rizome, United States and Philippines), who outlined large-scale plantation models linking bamboo production with housing materials and carbon markets.

Together, these guest speakers showed that Australia can build on an established international evidence base.

Australian capability

Australian researchers and practitioners highlighted the growing domestic capability to support an engineered bamboo industry.

- **Professor Mahmud Ashraf** (Deakin University) presented research demonstrating the structural performance of engineered bamboo beams is comparable or superior to CLT.
- Representatives from Deakin University, Griffith University, Queensland University of Technology and the Australian National University explored ongoing research and testing
- **Standards Australia**, represented by former CEO of the Australian Building Codes Board Neil Savery, confirmed a willingness to explore future recognition pathways within Australia's national codes and standards.
- Architects, engineers and manufacturers shared practical experience with emerging applications.

Common themes

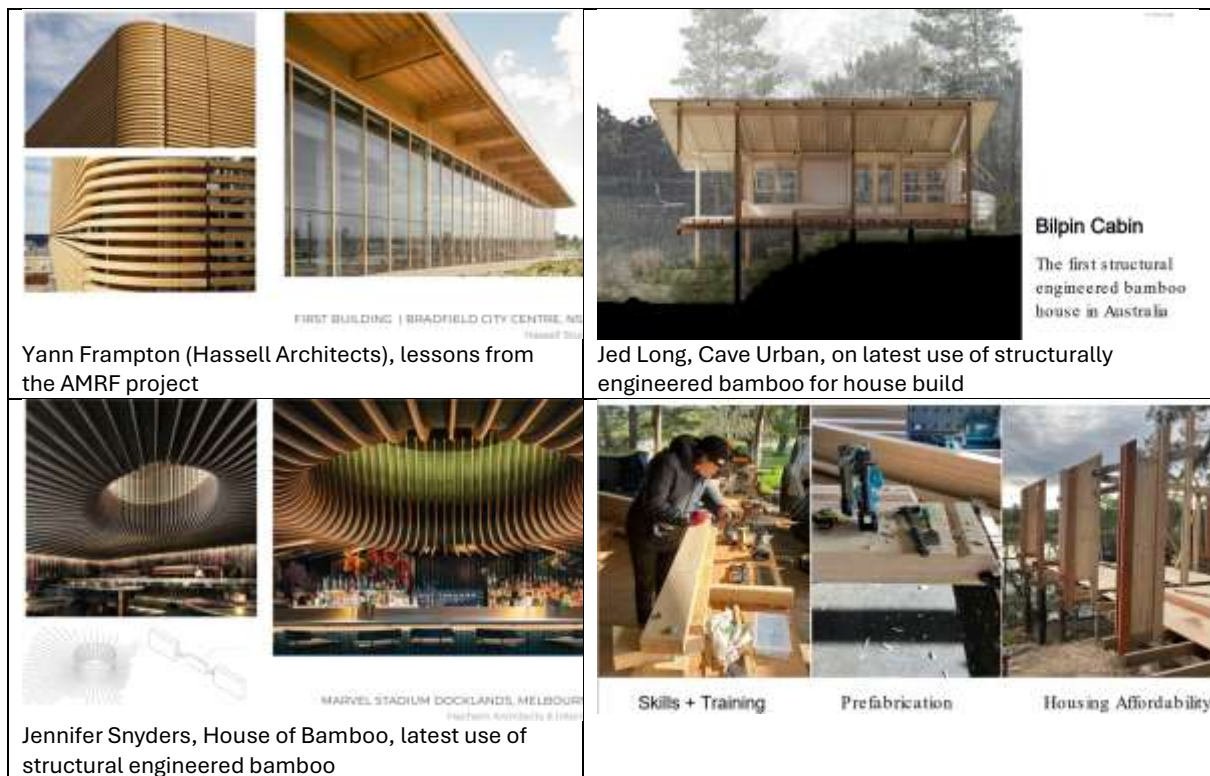
Across the three-day program, several consistent priorities emerged:

- **Growing and agriculture:** Demonstrations of bamboo's role in rehabilitating degraded land, restoring soil and sequestering carbon; Australia can replicate the model in Asia and South America that has already scaled to meet demand.
- **Architecture and building:** Structural engineered bamboo is a proven material with versatility across cladding, joinery and major structural elements.
- **Investment and policy:** Panel discussions focused on the enabling frameworks needed for a new industry: coordinated investment, integration with carbon credit schemes, and recognition of bamboo within national forestry and housing strategies.

Outcomes

The Summit helped build relationships across research, government and industry and reinforced that many of the technical foundations already exist. Rather than beginning a new conversation, it provided a platform for coordinating the next phase of work: developing the standards, demonstration projects and investment needed to establish an Australian engineered bamboo industry.

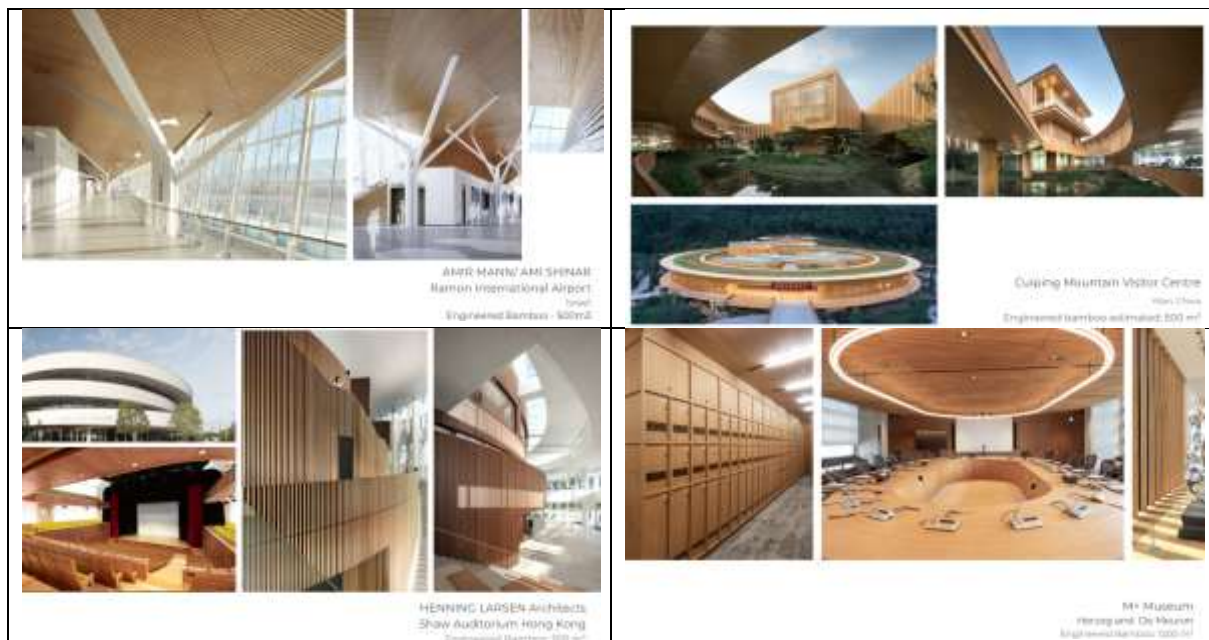
Australian case studies



“To succeed with bamboo, we must respect its material properties and leverage them through correct application. Extensive testing is essential to ensure predictable performance, much like engineered timber, building confidence for its use in construction.”

Matt Burke, Ironwood Engineers

International projects



Appendix B: Full Detailed Roadmap

	Phase 1: Foundations and Feasibility (Year 1-2)	Phase 2: Tech Integration and Small-Scale Operations (Year 3-4)	Phase 3: Market and Operational Scaling (Year 5-6)	Phase 4: Harvest and Commercialisation (Year 7-8)	Phase 5: Expansion and Innovation (Year 9 onwards)
Development of Industry Business Plan and Market Development (Refer Start Up Investment Actions within Phase 1 Plan)	Develop a detailed business plan including: - Feasibility study: Develop a whitepaper assessing the feasibility of local structural engineered bamboo production, including identification of optimal regions for bamboo cultivation and specific target areas for pilot plantation - Join INBAR to access resources - Economic analysis: Conduct a broader economic impact analysis to understand the potential of the engineered bamboo industry on Australian economy, including job creation, regional economic benefits, and overall investment attractiveness - Industry business plans and financial modelling for production including plantations, harvesting and processing - Analysis of market potential: Evaluate the existing wood product market, its growth potential, and the market opportunities for engineered bamboo - Market entry strategy: Determine how bamboo will gain market share and identify the initial target markets ('beachhead markets').	- Establish branding for Australian bamboo products - Prototype projects to pilot and demonstrate use in market(s), leverage, webinars and media outlets - Anchor major partners in building sector market(s) - Set up initial distribution and supply chain networks.	- Prior to first harvest, focus on developing the market - Develop distribution channels.	- Launch bamboo products in domestic market - Host or participate in international bamboo conferences.	- Adjust marketing strategies based on initial sales feedback - Broaden market offerings and international potential markets.

Standards, Testing & Certification	- Identify relevant codes, standards, and regulations and potential policy issues with Standards Australia - Develop industry standard (as an option), utilising international standards (ICC-ES) - EPDs for international products - Engage with Responsible Wood - TM11 Engineered Timber Standard engagement - Engage with QLD DAF on durability testing - Structure and fire testing.	- Establish Responsible Wood certification agreement - Imported product testing and demonstration projects use to ensure products can meet the performance requirement of the NCC - Lead in setting new performance standards.	Certified plantation: - Engineered bamboo product testing - Engineered bamboo product labelling - Certify products upon processing - Generate performance data.	- Undertake LCA and EPD for local Australian engineered bamboo based on actual harvesting data - Benchmark performance data.	- Achieve certifications for sustainable practices - New performance standards for bamboo products and/or building systems.
Policy Advocacy / Stakeholder Engagement	- Initiate dialogue with government bodies for supportive policies - Research institutions including potential for CRC or ARC partnerships - NGO engagement: WWF Future Forests - Associations: National Farmers' Federation (NFF), Natural Resource Management (NRM) and CANEGROWERS - Explore First Nations opportunities - AgriFutures, Clean Energy Finance Corporation (CEFC), National Reconstruction Fund Corporation (NRFC), Northern Australia Infrastructure Facility (NAIF) and Regional Investment Corporation (RIC).	- Submit application for Australia to join INBAR - Develop partnerships.	- Leverage INBAR for international trade shows and market introductions - Implement community engagement programs.	Share updates on harvesting with stakeholders.	Continue expanding plantations and processing capabilities, optimising operations with data from initial cycles.

Technology Development	Conduct market and feasibility studies: - Analyse global and local demand for bamboo products, including structural engineered bamboo - Startup investment: Utilise feasibility study for seeking investment.	- Research and select AI and drone technology providers - Start small-scale implementation for monitoring and data collection - Integrate AI for plantation monitoring growth conditions / predicting harvest yields - Use drone data for planting strategies.	- Partner with robotics firms or universities for R&D - Prototype testing in controlled environments - Start developing or adapting robotic systems for bamboo harvesting, aiming for operational readiness by the first harvest cycle.	- Expand AI systems for broader plantation management - Regularly review and adapt operational practices based on technological advancements and market changes.	Further expand plantations considering market demands.
Planting / Processing & Harvest	Climate and soil suitability and initial planting - Complete identification of optimal regions for bamboo cultivation - Secure land agreements or purchases - Begin trials with different bamboo species - Define management practices to maximise environmental benefits, focusing on carbon sequestration, biodiversity, and community engagement.	Continue planting: - Scale and broaden planting based on initial trial results - Test various bamboo products, focusing on engineered bamboo.	Processing pilots: - Design and build pilot plants for bamboo processing for engineered bamboo development - Enhance biodiversity measures in plantations - Increase plantation areas significantly.	First harvest: - Begin harvesting using developed technologies - Evaluate and refine harvesting. Scaling production: - Scale up processing facilities and expand plantations based on market feedback and technological performance.	Innovation in products: - Invest in R&D for new applications - Patent new technologies or processes developed - Publish findings and innovations from the project.

Carbon Recognition	Bamboo category recognition within embodied carbon databases - Complete NABERS category recognition and EPD inclusion and address dedicated engineered bamboo category in other tools, Soil Carbon Method 2021: - Confirm applicability with the Clean Energy Regulator (CER), review principles for ACCU compliance - Engage a project development consultant to prepare land management plans for zero-soil-disturbance harvesting eligibility (baseline: 5+ years pasture/cropping/fallow land). Carbon Credit Scheme development: - Develop methodology for above-ground biomass and product carbon sequestration. Submit Expression of Interest (EOI) for BFCQ on DCCEEW's Development Tracker. Dynamic LCA: - Initiate consensus-building with researchers (e.g., Deakin University), policymakers, and industry (e.g., INBAR) to define Dynamic LCA's role for short-rotation crops, exploring pilot data collection frameworks.	Soil Carbon Method 2021: - Calculate forward abatement estimates, register projects with CER, conduct benchmark carbon stock assessments before soil improvements. Carbon credit scheme development: - Seek approval for the BFCQ method, integrating above-ground and soil carbon data from small-scale plantations. Dynamic LCA: - Develop initial data sets from pilot plantations (e.g., carbon flow timing over 4-5 years), collaborate with international experts to model engineered bamboo's net cooling effect.	Bamboo category recognition within embodied carbon databases - Use the recognised engineered bamboo category as standard pathway in NABERS ratings and project specifications. Soil Carbon Method credit generation: - Measure soil carbon changes post-first harvest, calculate abatement, issue project reports, finalise audits, issue ACCUs, and identify credit markets Carbon credit scheme development: - Prepare for post-harvest implementation, refining BFCQ with initial harvest data. Dynamic LCA: - Pilot dynamic LCA models with first harvest data, engage policymakers to propose updates to national carbon accounting frameworks.	Soil Carbon Method credits sale: - Market and sell ACCUs, leveraging 30-45 million tons CO₂ sequestration data. Carbon credit scheme: - Development: Conduct carbon/soil stock assessments, ensure third-party verification for BFCQ scalability. Dynamic LCA: - Seek regulatory recognition of Dynamic LCA, integrating it with BFCQ to enhance engineered bamboo's climate mitigation claims, with industry workshops to refine models.	Soil Carbon Method Credits sale: - Continue marketing credits, re-estimate carbon stocks every 5 years (first in 2037), ensuring 100-year permanence. Carbon credit scheme development: - Conduct carbon/soil assessments, growth measurements, third-party verification, and re-estimate stocks every 5 years. Dynamic LCA: - Finalise dynamic LCA integration into national standards, develop industry guidelines for engineered bamboo applications, and monitor long-term carbon flow impacts.
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Risk Management	Conduct Comprehensive Risk Assessment Study: ▪ Identify potential risks in market entry, land acquisition, environmental impact, and initial investment ▪ Include legal, environmental, financial, and operational risks including carbon credit/s generation. ▪ Quarterly risk review meetings.	▪ Technology and operational risk Workshop on risks associated with new technology integration (AI, drones, robotic harvesting) ▪ Focus on technology failure, integration issues, and scalability risks ▪ Quarterly risk review meetings	▪ Market entry risk analysis including competition, demand volatility, supply chain disruptions, and regulatory changes ▪ Develop contingency plans for identified high-impact risks ▪ Quarterly risk review meetings.	▪ Product launch and harvest risk review on harvest yield uncertainties, quality control, logistics, and market reception ▪ Stress testing of the supply chain under different scenarios ▪ Quarterly risk review meetings.	▪ Expansion Risk Assessment ▪ Quarterly risk review meetings.
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Appendix C: Research Summary

Research to Scale Productivity, Carbon and Construction by 2035

Roadmap Theme	Research Topic	Objectives	Research Needed / Interested University	Outcomes and Implications
2.1 Investment & Market Development	Harvesting technology	Develop mechanised systems, AI and automation for productivity	Study mechanised harvesting, AI automation, and metrics. Needs growers for pilots	Increased productivity, reduced labour costs. Significance: Strengthens funding case. Impact: Jobs in mechanised harvesting if funded.
2.4 Technology Development	Processing	Create efficient lamination methods to scale production	Analyse lamination and bio-products. Needs processors for trials (Phase 2, 2028-2029).	Reduced costs, enhanced competitiveness. Significance: Improves efficiency if funded. Impact: Processing jobs.
2.4 Technology Development	Product development	Innovate engineered bamboo products for commercial buildings	Conduct durability and structural testing. Needs architects/builders for pilots (Phase 3, 2030-2031). Includes potential composites like hemp-engineered bamboo precast (non-structural infill) or softwood-bamboo hybrids.	Stronger products and expanded applications. Significance: Supports building goals if funded. Impact: Design opportunities.
2.4 Technology Development	Residential framing systems	Design engineered bamboo framing for affordable units	Test load-bearing and design efficiency. Needs developers for pilots (Phase 2, 2028-2029).	Reduced costs, efficient systems. Significance: Addresses housing crisis if funded. Impact: Construction jobs.
2.4 Technology Development	Commercial building applications	Explore Engineered Bamboo for multi-storey buildings by 2035	Study structural integrity. Needs developers for trials (Phase 4, 2032-2033).	Expanded market, diverse options. Significance: Diversifies applications if funded. Impact: Engineering roles.
2.4 Technology Development	Circular supply chain optimisation	Design an AI-optimised circular supply chain for Engineered Bamboo	Develop AI models for logistics/waste minimisation; test composites. Needs farmers/processors/policymakers for pilots.	Reduced carbon emissions, integrated systems. Significance: Pioneers circular economy if funded. Impact: Logistics jobs; bio-based synergies.
2.6 Carbon Recognition	Soil carbon	Quantify soil carbon sequestration	Measure carbon changes. Needs land owners for assessments (Phase 1, 2026-2028).	Validated sequestration data, access to credits. Significance: Justifies carbon funding. Impact: Grower revenue if supported.

Appendix D: Standards, Testing & Certification

Background

Structural engineered bamboo is gaining recognition as a sustainable building material, with several International Organization for Standardization (ISO) standards developed to ensure its quality and performance.

ISO 22156 provides basic design guidance for full culm (whole bamboo stem) construction, while ISO 22157:2019 *Bamboo structures – Determination of physical and mechanical properties of bamboo culms – Test methods* details the methods for determining the physical and mechanical properties of bamboo.

Additionally, ISO 23478:2022 focuses on engineered bamboo products, providing test methods for determining their physical and mechanical properties. (See full summary below under Standards Development).

Structural bamboo is already the subject of an International Code Council Acceptance Criteria (AC162), which is the equivalent of a technical specification that can be used in the evaluation of engineered bamboo for the purpose of demonstrating compliance with the National Construction Code (NCC) either through CodeMark Australia or the use of an Evaluation Service Report. Engineered bamboo can comply with the NCC without relying on a Deemed to Satisfy provision.

Under NCC clause A5G3, acceptable forms of evidence include certifications like CodeMark Australia or certificates from bodies accredited by the Joint Accreditation System of Australia and New Zealand (JASANZ). These must confirm that a material's properties and performance fulfill specific NCC mandates.

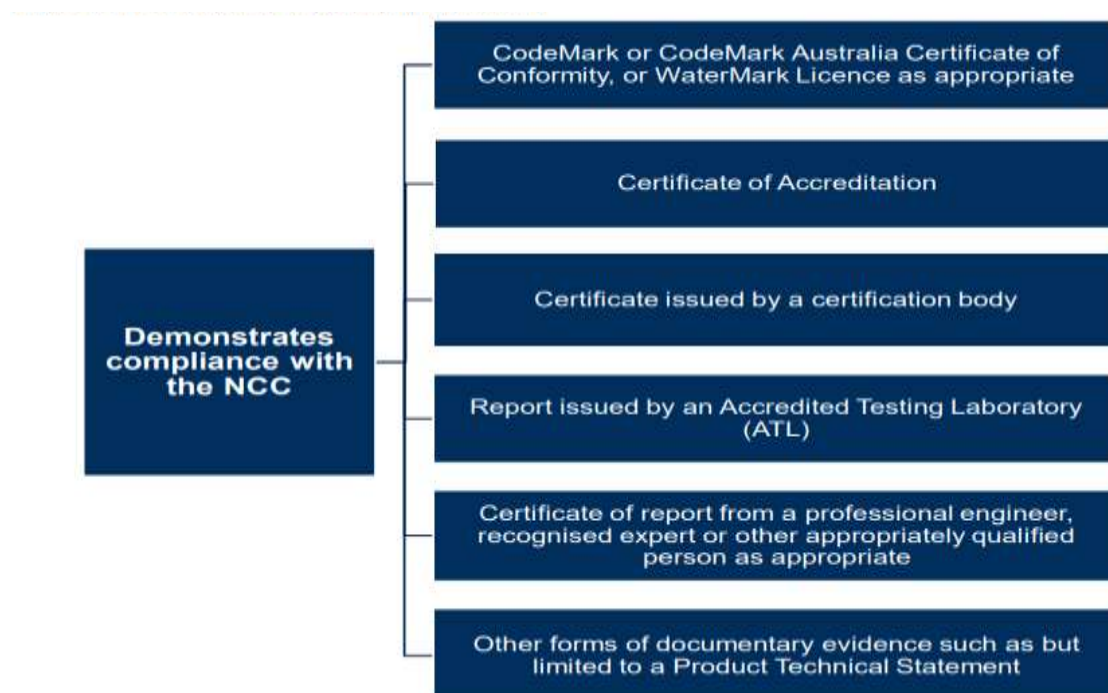


Figure 11: National Construction Code: A5G3 Evidence of Suitability.

Recent Australian Testing of Structural Engineered Bamboo

Dr Mahmud Ashraf, Professor of Structural Engineering & Associate Head of School (Research) – School of Engineering at Deakin University is a member of the construction task force of International Bamboo and Rattan Organisation (INBAR) and represents Australia on ISO standards committee for developing product specification for glued laminated bamboo.

Dr Ashraf is currently testing large cross-sections of structural engineered bamboo (supplied by House of Bamboo). Upon completion of analysis of all collected data, the intention is to develop design rules.



International Standards and Committees

ISO/TC 165 – Timber structures have the following standard in their committee portfolio:

- ISO 19624:2018 Bamboo structures – Grading of bamboo culms – Basic principles and procedures, which is under review. Standards Australia notes an opportunity to be involved in this work.
- ISO/TC165 WG12 – Structural use of bamboo WD – Bamboo structures - Bamboo scrimber – Product specifications (Dr Mahmud Ashraf representative).

ISO/TC 296 – Bamboo and rattan is a possible avenue for participation. This committee's portfolio includes:

- ISO 21625:2020 Vocabulary related to bamboo and bamboo products
- ISO 23066:2021 Vocabulary related to rattan materials and products
- ISO 6128:2023 Laminated products made of bamboo strips for indoor furniture purposes – Requirements and test methods,

Other bamboo standards of which Dr Mahmud Ashraf is a technical committee member includes:

- WD – Bamboo structures – Engineered bamboo – Structural design
- ISO 7567: 2024 – Bamboo structures – Glued laminated bamboo – Product specifications
- ISO 23478: 2022 Bamboo structures – Engineered bamboo products – Test methods for determination of physical and mechanical properties
- ISO 5227:2023 Bamboo structures – Engineered bamboo products – Test methods for determination of mechanical properties using small size specimens
- Construction Task Force, INBAR (International Bamboo and Rattan Organization)

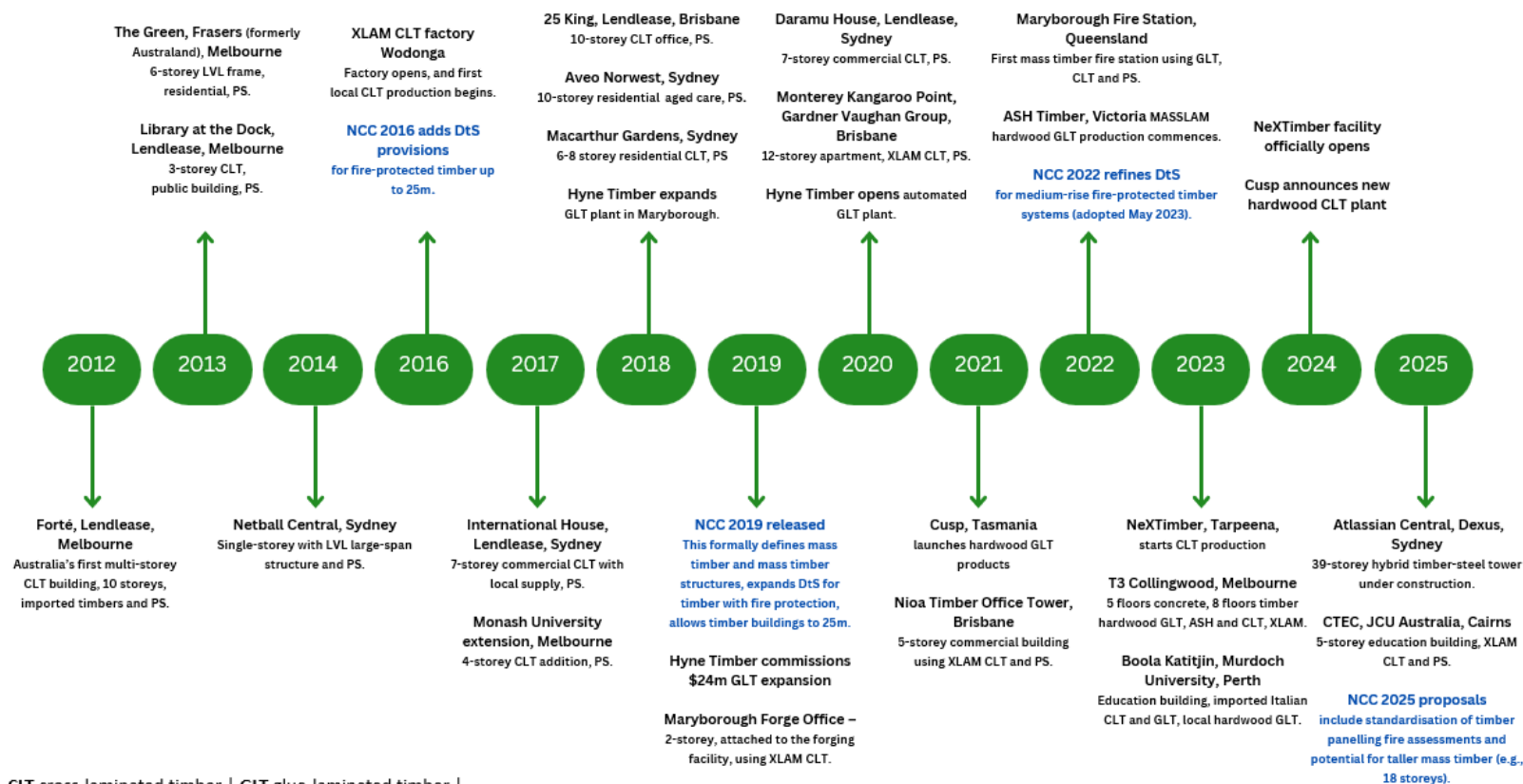
Forest and Plantation Certification

According to Simon Dorries, former CEO of Responsible Wood, bamboo plantations can be certified under a forest management standard. The following criteria would apply:

1. Bamboo originates in forests and under AS/NZS 4708 is considered a “non-wood forest product” and is eligible for certification.
2. Bamboo is already certified under other forest certification schemes e.g. CFCC and FSC.
3. Performance requirements will be identical/similar to other plantation-based forestry systems.
4. AS/NZS 4708 is a standard for the sustainable management of forest and forest-based ecosystems and does not discriminate on forest type.

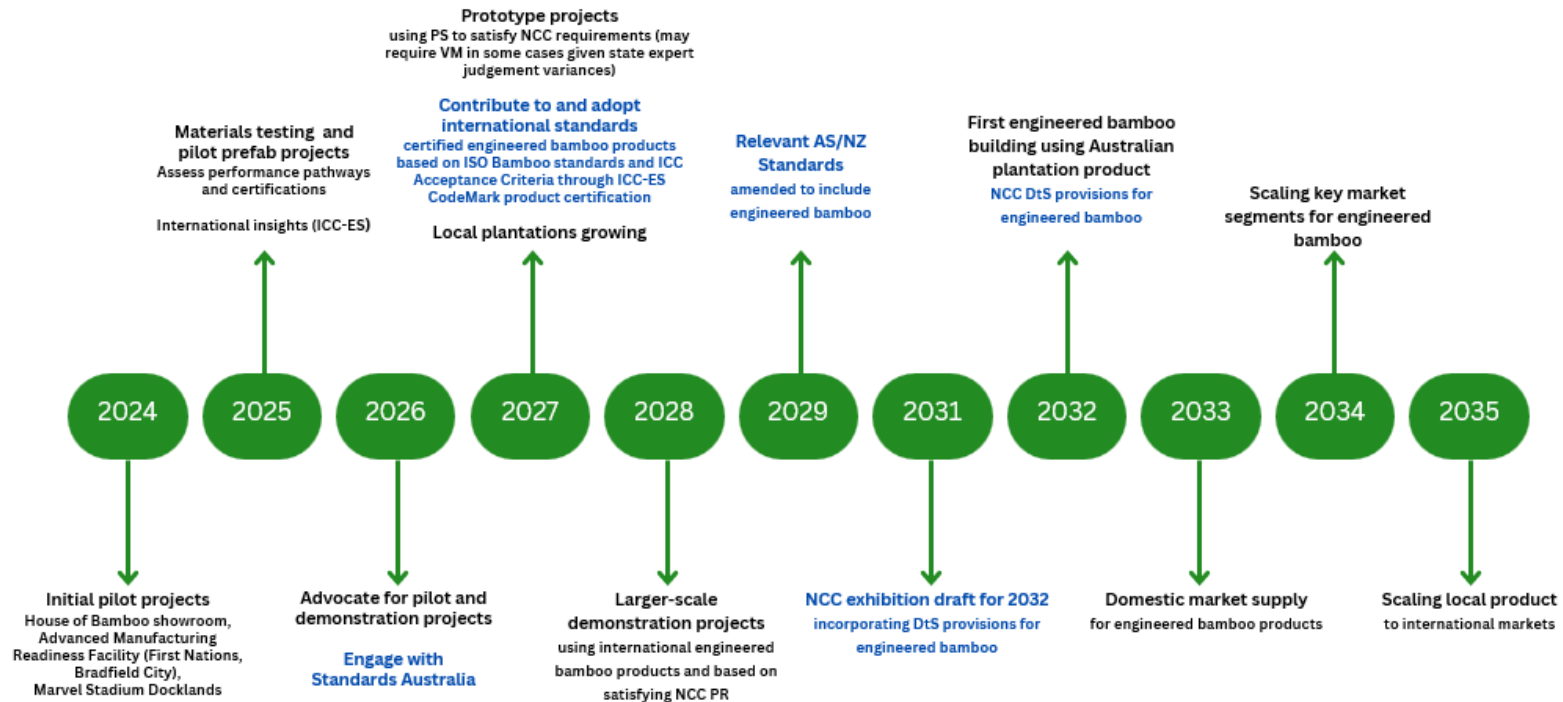
Appendix E: Timelines for engineered timber and engineered bamboo

Mass and engineered timber timeline:2012-2025



CLT cross-laminated timber | GLT glue-laminated timber |
LVL laminated veneer lumber | NCC National Construction Code |
DTS Deemed-to-Satisfy | PS Performance Solution

Engineered bamboo timeline:2024-2035



DtS Deemed-to-Satisfy | ICC International Code Council | ICC-ES International Code Council Evaluation Service
 ISO International Organization for Standardization | NCC National Construction Code
 PS Performance Solution | PR Performance Requirement | VM Verification Method

Glossary

ABARES	Australian Bureau of Agricultural and Resource Economics and Sciences
ABS	Australian Bureau of Statistics
ACCU	Australian Carbon Credit Unit, for soil and biomass credits
ARC	Australian Research Council
ASBEC	Australian Sustainable Built Environment Council
ASFI	Australian Sustainable Finance Institute
ASTM	American Society for Testing and Materials, now ASTM International
BFCQ	Bamboo Forest Carbon Quantification, method to measure carbon stocks
BSA	Bamboo Society of Australia
CEFC	Clean Energy Finance Corporation
CLBT	Cross-laminated bamboo and timber
CLT	Cross-laminated timber
CO ₂	Carbon dioxide
CRC	Cooperative Research Centre
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DtS	Deemed-to-Satisfy, prescriptive building code provisions
Dynamic LCA	Life cycle assessment reflecting rapid regrowth carbon flows
Engineered bamboo	Structural engineered bamboo, a processed bamboo product for construction
EPD	Environmental Product Declaration
FWPA	Forest & Wood Products Australia
FSC	Forest Stewardship Council
IBC	International Building Code
ICC-ES	International Code Council Evaluation Service
INBAR	International Bamboo and Rattan Organisation
IPCC	Intergovernmental Panel on Climate Change
ISO	International Organization for Standardization
JASANZ	Joint Accreditation System of Australia and New Zealand
LCA	Life cycle assessment
NAIF	Northern Australia Infrastructure Facility
NFF	National Farmers' Federation
NCC	Australia's National Construction Code
NRM	Natural resource management
Static LCA	Life cycle assessment using fixed assumptions about carbon flows over time
WWF	World Wide Fund for Nature

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