

AUSTRALIAN FOREST PRODUCTS ASSOCIATION (AFPA)

Comment on **Green Star – Design & As Built** and **Green Star – Interiors Minor Update** **Structural Engineered Timber Consultation Paper**

JANUARY 2017

Introduction

The Australian Forest Products Association (AFPA) appreciates the opportunity provided by the Green Building Council of Australia (GBCA) to contribute to the ongoing development of the Life Cycle Assessment (LCA) for building products through the *Green Star – Design & As Built* and *Green Star – Interiors Minor Update* Consultation Paper (the Paper).

AFPA is the national industry association representing the interests of the Australian forestry, wood products, paper products and bioproducts industry. AFPA advocates to governments, the general public and stakeholders on matters to do with the sustainable development and use of Australia's forest, wood and paper products.

The major markets for Australia's forest and wood products demand a wide range of fit-for-purpose products which are flexible in their application and have strong environmental credentials. The Australian industry is strongly committed to sustainability principles.

General comment on the Paper

AFPA welcomes the development of a Prescriptive Pathway for obtaining Green Star credits for structural timber, as an alternative to the Performance Pathway currently available.

However, industry is of the strong view that the **pathway should be available for all structural timber, not simply engineered timber products**. There is no rationale that we are aware of that would justify the inclusion of engineered timber but the exclusion of solid milled structural timber.

AFPA holds the strong view that the **proposed maximum of three available points (two for reduced embodied energy and one for industry capacity building) does not adequately recognise the environmental sustainability benefits of structural timber**. As noted in the Consultation Paper:

Buildings with a (...) timber structure offer valuable life cycle impact reductions. This includes less embodied energy impacts when compared to traditional structural materials, increased use of pre-fabrication resulting in construction efficiencies and the use of a renewable source material.

Therefore, a maximum of three points does not sufficiently acknowledge the environmental benefits of timber, compared, for example, with concrete and steel. Indeed, building constructed of predominantly concrete or steel have the opportunity to gain **equal or more** Green Star points than predominantly timber buildings (see detail under specific question below); **this appears to contradict the intent of the Green Star system to encourage sustainability in building construction**. AFPA would like to see the maximum attainable to be increased, to strengthen the incentives in order to achieve the Paper's stated goal 'To support the uptake of building's being constructed from (...) timber'.

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Specific comment on the Paper

OVERVIEW (Page 4)

Do you agree with the introduction of a Prescriptive Pathway for recognising the use of structural engineered timber? Please explain why you agree with the introduction, or not.

The introduction of a Prescriptive Pathway for recognition of structural timber is welcomed. This will improve the opportunity to gain Green Star credits for positive environmental outcomes that proceed from the use of renewable timber-based products. However, AFPA strongly recommends that this pathway should relate to all structural timber, rather than only structural engineered timber. Environmental benefits that are realised through the use of structural timber are common across all structural timber products.

Technical Requirements (Page 5)

Pathway Criteria

1. Do you agree with the proposed criteria in the draft credit? Are there any other considerations the GBCA should have in rewarding the use of structural engineered timber?

The proposed criteria in the draft credit are appropriate.

However, we do not consider that the maximum of three points is appropriate. There are clear environmental advantages to using timber compared to concrete and steel: less embodied energy impact, increased use of pre-fabrication resulting in construction efficiencies, recyclable, and the use of a renewable, carbon storing source material. Timber has the least carbon released during manufacture (approx. 0.2kg CO₂/kg) compared to concrete (approx. 1.25kg CO₂/kg), and overall as a material, has a net positive effect (carbon sequestration during tree growth plus ongoing carbon storage in timber products).¹

Yet despite these significant benefits, predominantly timber buildings cannot receive more Green Star points than a concrete or steel alternative. Analysis by industry members (see table below) concludes that a concrete building can receive up to six points, a steel framed building can receive up to five points, and a timber building can receive up to six points. **Such an outcome does not accurately reflect the sustainability benefits** of timber and therefore cannot positively influence construction decisions towards the more environmentally sustainable choices.

AFPA considers that a higher number of attainable points are required to meaningfully encourage behavioural change in the market that would result in more environmentally friendly and low embodied energy alternatives to steel and concrete.

¹ Glover, J, 2001, 'Which is Better? Steel, Concrete or Wood: A Comparison of Assessments on Three Building Materials in Common Use in the Housing Sector', Department of Chemical Engineering, University of Sydney

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Table 1: Points comparison between concrete, steel and timber buildings

Comparing the maximum points available in the Materials Category to predominantly concrete, steel and timber buildings comparatively:	
<p>1. Credit 19 Life Cycle Impacts has max 7 points available for a full LCA, max 5 for a prescriptive pathway.</p> <p>a. 19B.1 where concrete makes $\geq 1\%$ of contract value 2 points are available for reduction in Portland cement content, 0.5 points for water reduction, 0.5 points for aggregates reduction. Total 3 points available.</p> <p>b. 19B.2 where steel (structural or reinforcing) makes $\geq 1\%$ of contract value, 1 point is available. This is either for reduced mass of steel framing or reduced mass of steel reinforcing in a concrete framed building. Total 1 point available.</p> <p>c. 19B.3 is for building reuse, max 2 points for façade reuse, max 2 points building structure reuse.</p> <p>d. Proposed 19B.4 timber. 1 point for 30% of GFA being timber, 2 points for 70%. 1 point where $\geq 50\%$ by volume of timber is “manufactured or fabricated” in Australia.</p>	
<p>2. Credit 20 Responsible Building Materials 3 points available:</p> <p>a. 20.1. 1 point available for steel in either concrete or steel buildings only (not available to timber buildings).</p> <p>b. 20.2. 1 point available for certified timber in any building (including concrete formwork, hoardings etc as well as structural, joinery, furniture), 95% by cost must be certified. Timber must be $\geq 0.1\%$ of total cost</p> <p>c. 20.3. 1 point for reduction in PVC</p>	
<p>3. Credit 21 Sustainable Products. 3 points available.</p> <p>This is based on percentage value of products meeting product-based sustainability criteria such as re-used, recycled, EPD, 3rd party certification. 3 points available for 9% compliant products, 2 for 6%, 1 for 3%.</p>	
<p>Conclusion</p> <p>Leaving aside Credit 21 and Credit 20.3 (which are much the same for all building types), and using the prescriptive pathway under Credit 19 only for a new building (no re-use):</p>	
<p>1. A concrete building can pick up 3 points for 19B.1, 1 for 19B.2, 1 for 20.1, 1 for 20.2.</p>	<p>Concrete: Total 6 points</p>
<p>2. A steel framed building can get 3 points for 19B.1 assuming foundations etc make up $\geq 1\%$ contract value (unsure if this is reasonable), 1 point for 19B.2, 1 point for 20.1, 1 point for 20.2.</p>	<p>Steel: Total 5 points</p>
<p>3. A predominantly timber building can get 3 points for 19B.1 assuming foundations etc make up $\geq 1\%$ contract value (unsure if this is reasonable), 1 point for 19B.2 where steel reinforcing in foundations etc makes up $\geq 1\%$ contract value (unsure if this is reasonable), 3 points for 19B.4 – but only 5 points available in 19B total, plus 1 point for 20.2.</p>	<p>Timber: Total 6 points</p>

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However, if the smaller foundations mean that concrete is <1% of contract value and reinforcing steel is <1% of contract value, the predominantly timber building will get max total 4 points .	
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Therefore, the structure proposed by GBCA does not allow a predominantly timber building to score more points than a comparable concrete building – despite the multiple sustainability benefits of building in timber.
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19B.4.0 Minimum Product Attributes

2. Do you agree with the 'Minimum Product Attributes' requirements? If not, please explain why.

The 'Minimum Product Attributes' are considered appropriate.

19B.4.1 Reduced Embodied Impacts

3. Is the method for calculating the structural engineered timber used in the building by area clear? Is there any additional guidance required?

AFPA reiterates that 'engineered' should be removed so all structural timber is included.

It is assumed that the exclusion of the lift shaft is intended to refer only to the area of the lift shaft, however, some members saw the wording as ambiguous and would like it clearly stated that this would not include the entire floor where a lift shaft is located.

It should be noted that timber may be used in vertical structures such as walls and lift shafts. However, it is acknowledged that calculating the proportion of timber used becomes more difficult when these structures are included. In the interests of simplicity of calculation, the proposed method that uses building area is supported. However, it would be beneficial if a suitable calculation for these components (when constructed from timber solutions) could be developed in the future.

4. Do you agree with the 30% and 70% benchmarks? If not, please explain why.

It is noted that points will be awarded on a sliding scale basis (to one decimal place). This is a useful mechanism and is welcomed.

However, AFPA holds the strong view that the proposed maximum of three available points (with two as the maximum available for reduced embodied energy) does not adequately recognise the benefits of structural timber. As noted in the Consultation Paper:

Buildings with a (...) timber structure offer valuable life cycle impact reductions. This includes less embodied energy impacts when compared to traditional structural materials, increased use of pre-fabrication resulting in construction efficiencies and the use of a renewable source material.

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AFPA's view is that the considerable advantages of timber in terms of embodied energy impacts are not adequately recognised by a maximum of two points for this criterion. It is noted that concrete can receive up to two credit points for reducing Portland cement content by 40%, despite the fact that overall, concrete's embodied energy impacts are more than six times higher than timber's during the manufacturing process (approx. 1.25kg CO₂/kg versus 0.2kg CO₂/kg). Further, concrete can obtain an additional point for reduction in steel reinforcement (Credit 20.1), which is not available to timber buildings. As mentioned earlier, when carbon sequestration and storage are also factored in, timber is in fact a positive contributor to the environment. There are also many possibilities for recycling possibilities for timber at the end of the life cycle which is not the case for cement. Therefore, it is not reasonable for timber to be able to attain only the same number of points as concrete.

AFPA would like to see the maximum points attainable to be increased, to strengthen the incentives in order to achieve the Paper's stated goal 'To support the uptake of buildings being constructed from (...) timber'. AFPA supports a suggested maximum of four points for the reduced embodied impacts:

Where the minimum requirement is met, the following points be awarded:

- For 30% of the building's GFA – 1 point;
- For 50% of the building's GFA – 2 points;
- For 70% of the building's GFA – 3 points; and
- For 90% of the building's GFA – 4 points.

19B.4.2 Industry Capacity Building

5. Do you agree with the three initiatives being rewarded under 'Industry Capacity Building'? Will it result in any negative outcomes? Any suggestions for improvement?

The three initiatives are commendable. However, AFPA notes that initiatives will be rewarded by one point for **any one** of the three factors. AFPA is of the view that there should be greater reward where **more than one** of these factors is present, and suggests a suitable sliding scale would be for 0.5 of a point for each of the three components. This approach will encourage capacity building in a more direct way.

Also, consistent with earlier comments that all structural timber should be included in this pathway, the references to 'engineered' structural timber should similarly be removed in this section.

6. Do you agree with the 50% (by volume) benchmark under 'Industry Capacity Building'? If not, please explain why.

AFPA has received feedback from industry suggesting that this benchmark should be higher and is supportive of this being pursued.

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Scope of Pathway (page 11)

7. Do you agree with limiting the scope of this pathway to engineered timber only? OR should the criterion be expanded to include the structural use of non-engineered timber? For example, milled timber in cassette construction. Please explain the rationale for either approach.

AFPA does NOT agree with limiting the scope of the Prescriptive Pathway to engineered timber only, and strongly advocates that the criterion be expanded to include all structural timber products. The environmental benefits that are realised through the use of structural timber are common across all structural timber products. The exceptions may be the construction efficiencies available from pre-fabricated engineered products; however, sawn (or milled) timber involves fewer processes that produce negative environmental effects, so there does not appear to be any justification for the exclusion of these timber products. No rationale has been provided in the paper to explain the limitation of scope to engineered wood products and AFPA is unaware of any factors that would support it.

It should also be noted that the use of structural sawn timber far outweighs the volume of engineered wood products. To exclude sawn timber from the pathway would therefore preclude a large proportion of the timber construction market from accessing Green Star points through this pathway, which is presumably contrary to the intent. Given attempts (by local councils and others) to pursue lower embedded carbon goals for entire precincts - not just individual buildings - excluding sawn timber products would run counter to these initiatives.

A further risk in mandating only 'engineered wood products' is the potential for a structurally compliant solid timber member to be cut and re-joined in order to create a pathway compliant *engineered* structural timber member. Members have advised that it is conceivable that the scale and nature of GBCA compliant buildings could result in this outcome still being economically viable, despite the additional cost involved. Clearly such an approach would add to energy use through the extra processing and increase fibre waste, which would be counter to the intent of the pathway.

AFPA applauds GBCA's objectives of facilitating the uptake of best environmental practice products and materials selection in the Australian construction market, to deliver better environmental outcomes and to deliver these in a cost-effective manner. However, as the specific exclusion of wood products such as milled timber is not considered consistent with the aim of the credit system, AFPA reiterates the view that the application of the Prescriptive Pathway to all structural timber products would most fully meet those goals.

DEFINITIONS

Consideration may need to be given to further defining 'structural timber'. For example, the draft currently refers to "Non-structural applications such as particleboard, plywood, Medium Density Fibreboard (MDF) and decorative overlaid wood panels;". However, there are specific examples that complicate the application of this definition, e.g.:

- Would Plywood or some MGP pine used as part of a brace be considered a structural element? The system may be entirely reliant on their design integration, but given they may not be directly taking a load, would they be excluded?

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- Would flooring used to **span** a joist (thus taking a load) be considered to be structural or merely decorative? If it were not considered structural, at what thickness would it become structural?

AFPA therefore suggests that clarification be provided, by amending the explanation of ‘structural’ timber with the following deletions and additions:

Structural ~~engineered~~ timber – Made primarily of wood based components ~~remanufactured~~ into a structural member and complying with the requirements of AS 1720-2006: Timber Structures. **A structural member includes applications which bear, support or brace a load.** These products include Cross Laminated Timber (CLT), Laminated Veneer Lumber (LVL), Glulam and timber I-beams.

The following applications of ~~engineered~~ wood products are excluded from the scope of this credit **unless they meet the requirement of bearing, supporting or bracing a load as mentioned above:**

- Non-structural applications such as particleboard, plywood, Medium Density Fibreboard (MDF) and decorative overlaid wood panels;
- ~~Non-engineered wood products such as milled timber;~~ and
- Formwork

Guidance (page 11)

8. Is there any additional guidance required?

Under ‘Interaction with Other Green Star Credits’, it states:

Please also ensure that the cost of the concrete (19B.1) or steel (19B.2) represents at least 1% of the project’s contract value in order to target the relevant criterion.

It is unclear whether poured concrete cost in a lightweight building will exceed the 1% cost threshold. There is the possibility of creating the perverse outcome that concrete could be deliberately increased in order to meet this criterion. It is therefore suggested that this requirement be removed.

Documentation Requirements (page 12)

9. Is the documentation required to support compliance clear and easy to produce? Any suggestions for improvement?

For section 19B.4.2 (Industry Capacity Building) a Chain of Custody certificate demonstrating the source of the timber used has been grown or manufactured in Australia or New Zealand is listed as the required document. While this is easily achievable from manufacturers and wholesalers, it is not

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reasonable for fabricators and builders, who do not generally hold this certification and for whom it is prohibitively expensive and time consuming to obtain.

AFPA suggests that the other alternative methods of demonstrating that the timber has been grown or manufactured in Australia or New Zealand be specifically included, for example, the certification branding on timber in the structure.

The other suggested documents are appropriate. It is particularly commendable that there is a specific statement that alternate documentation to that listed may be provided so long as it is sufficient to provide evidence of the claims made.

10. Any final comments / suggestions?

AFPA appreciates this opportunity to comment on the Paper and looks forward to further involvement throughout the Update development.

Any queries about this submission, or contact for subsequent actions on this project, may be directed to Clare Scriven (Manager, Softwood Manufacturing) on 0419 221 506, or clare.scriven@ausfpa.com.au.