

Timber recycles carbon



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Timber Queensland Submission on the Queensland Building Plan Discussion Paper for industry and consumers

Background

Timber Queensland is the peak body representing the interests of the Queensland forest and timber industry supply chain; from forest growers, harvesters and haulers through to processors, manufacturers and fabricators, timber wholesalers and traders.

The Queensland forest and timber industry makes a significant economic contribution to the state economy, supporting 10,000 direct jobs and many thousands more along the full value chain, as well as contributing more than \$3.1 billion to the state economy. Many of these jobs are located in rural and regional areas across the state.

Introduction

Timber Queensland (TQ) welcomes the opportunity to comment on the Queensland Building Plan Discussion Paper, given the importance of timber as a building material in the housing and construction sector.

As an overarching principle, TQ supports an efficient and transparent building regulatory environment that can contribute to the economic, social and environmental development of Queensland. As identified in the Discussion Paper, over 200,000 Queenslanders earn a living in the building and construction sector, contributing \$44 billion to State economic activity. It is critically important to provide certainty for the building sector, remove unnecessary red tape and promote ongoing innovation.

While the Discussion Paper covers many facets of the building sector, TQ would like to focus on two key priority areas requiring greater attention. These are:

- Sustainable buildings; and
- Non-conforming building products.

Sustainable buildings

The Discussion Paper notes the significant environmental footprint of the building and construction sector, which nationally is estimated to contribute 23% of Australia's total greenhouse gas emissions.

An important feature of the forest products industry and the use of timber as a building material is its ability to provide multiple carbon emissions abatement pathways (refer Box 1).

Box 1: Benefits of using timber products

The significant potential for the forestry and forest products industry to contribute to climate change mitigation was acknowledged in the 4th assessment report of the International Panel on Climate Change (IPCC), which stated:

A sustainable forest management strategy aimed at maintaining or increasing forest carbon stocks, while producing an annual sustained yield of timber, fibre or energy from the forest, will generate the largest sustained mitigation benefit.

The major pathways for emissions abatement from the forest products industry include:

- the carbon sequestered in growing forests;
- the carbon stored in harvested wood products;
- the substitution of high emissions materials (e.g. steel, concrete) with wood and other fibre based products that have low embodied energy; and
- the use of woody biomass for renewable energy (including for thermal energy and biofuels), thereby displacing fossil fuels.

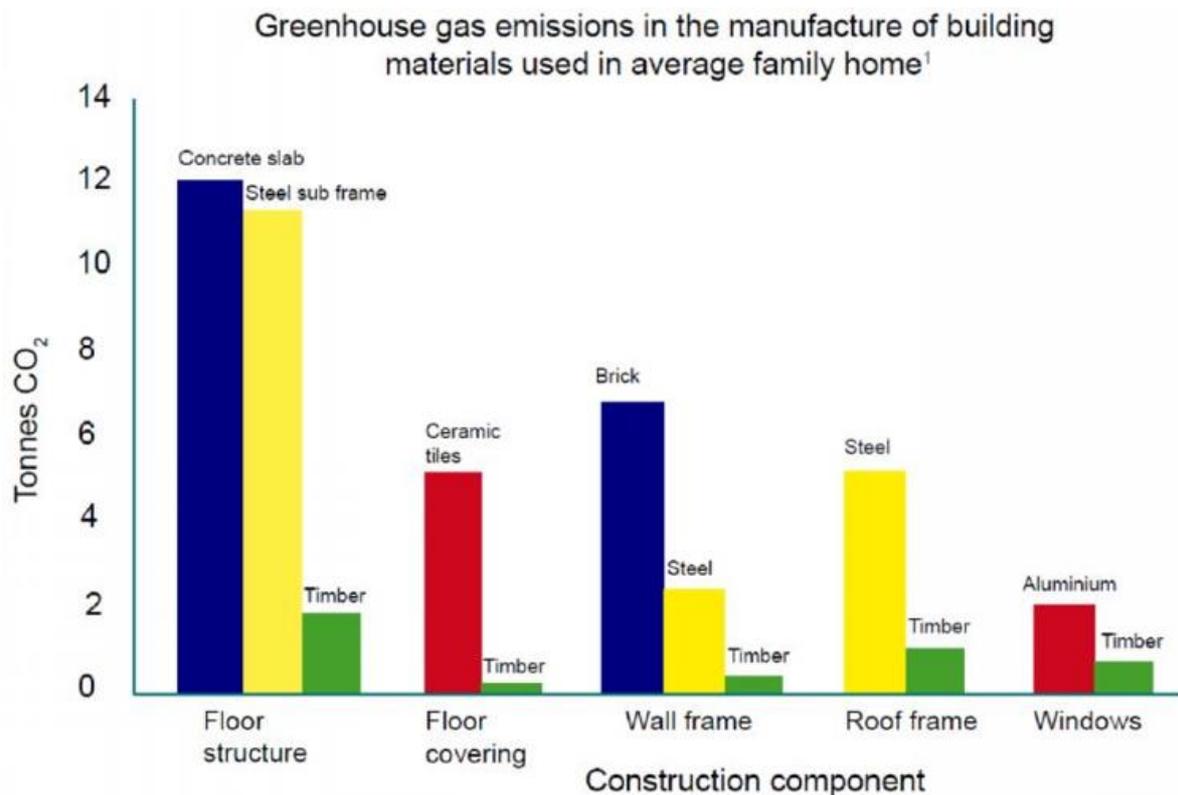
Taking into account embodied energy of building materials

TQ supports a Queensland Building Plan that takes into account the greenhouse gas impacts of buildings and promotes more sustainable building outcomes through the promotion of sustainable materials, renewability of resources and energy efficiency

There is now global international recognition of the significant greenhouse gas emission reduction benefits from using low embodied energy materials, such as timber, in building and construction. This is primarily due to the fact that trees are a sustainable biological resource that rely on photosynthesis from the sun to produce renewable wood products. This means, relative to other materials such as steel, aluminium and concrete, timber has very low embodied energy, with very low fossil fuel energy inputs used in its production.

A global study into the use of more wood in building and construction has found that using timber substitutes could save between 14 to 31 per cent of global carbon emissions by using 34 or 100% of the world's sustainable wood growth¹.

Within Australia, research has quantified the greenhouse gas emission benefits from using timber compared to other traditional materials in an average Australian family home (refer graph below).



Source: FWPRDC and CRC for Greenhouse Accounting (2006).

A more recent study in New South Wales also found that by maximising the use of timber in two popular housing designs in Sydney, approximately 30 tonnes of carbon emissions could be avoided (or saved) per house design². This represented a reduction in emissions of almost 50% compared to the use of traditional building materials. This same study found that the use of a 'timber maximised' design offset between 23 and 25% of the total operational energy of the houses.

These results demonstrate the significant potential when extrapolated across total levels of housing activity. For example, assuming half of all new residential dwellings

¹ Oliver, C.D., Nassar, N.T., Lippke, B.R. and McCarter, J.B. 2014. Carbon, Fossil Fuel and Biodiversity Mitigation with Wood and Forests. *Journal of Sustainable Forestry* 33: 248-275.

² Ximenes, F.A. and Grant, T. 2013. Quantifying the greenhouse benefits of the use of wood products in two popular house designs in Sydney, Australia. *The International Journal of Life Cycle Assessment* 18: 891-908.



built in Queensland were ‘timber maximised’ (e.g. around 20,000 dwellings) in any one year, this would equate to a saving of 600,000 tonnes per year, or 6 million tonnes over a 10-year period.

Another study by the RMIT University into the environmental impact of various building materials for a standard house design using life cycle assessment has demonstrated that using wood products rather than alternative materials could reduce greenhouse gas emissions by up to 51%.³ Other key findings included:

- substituting timber for more greenhouse gas (GHG) intensive building products in cladding, wall, roof and floor framing could reduce the GHG emissions of a typical house by up to 18 tonnes over its life;
- the biggest GHG reductions can be made by:
 - substituting timber cladding for brick veneer;
 - using timber for wall and roof framing instead of steel;
 - using timber for a suspended floor instead of either steel or concrete slab on ground;
- only minor additional building materials (and resulting GHG emissions) are needed to improve the energy efficiency of Australian homes from 5 to 6-star in all climates studied;
- the GHG emissions from the building materials contribute 14-45% of the total GHG emissions of a 5-star energy efficient house over a 50-year life cycle;
- the contribution of GHG emissions from the building materials increases to up to 50-51% of total GHG emissions when steel framing is used in Brisbane and Sydney where the house is designed for 6-star energy efficiency.

An additional benefit of promoting sustainable materials such as timber are the indirect benefits to personal health and well-being. Many studies have documented the physiological and psychological benefits when greater natural products such as timber are used in public and private buildings.⁴

³ Carre, A (2011). A comparative life cycle assessment of alternative constructions of a typical Australian house design. Report for Forest and Wood Products Australia, Project PNA147-0809, March.

⁴ Planet Ark (2015). *Wood: Housing, Health, Humanity* report. See: <http://makeitwood.org/documents/doc-1253-wood--housing--health--humanity-report-2015-03-00-final.pdf>

Building design

Over the past decade, federal and State governments have increasingly mandated energy efficiency measures via the Building Code of Australia (BCA). While these measures have generally received building industry support, they focus largely on building 'running' energy levels, with limited consideration of the more effective use of building design and materials that better suit the Queensland climate.

Regulations that encourage 'locked-up' indoor living in heavy mass, on ground houses, that usually require significant cut and filling of building sites in the Queensland climate, for example, may not be the most energy efficient outcome.

The concept of energy efficient building design, particularly in the context of living in the Queensland climate, is certainly not new. As part of the *Queensland Workers' Dwellings State Advances Act of 1916*, for example, Queensland Government advisory materials offered the following suggestions on building design:

“To assist applicants by providing a maximum of comfort and convenience in their homes consistent with their financial circumstances, the following suggestions are offered:

- *when about to set out the plan of your home, carefully consider the site in its relation to the dwelling proposed to be erected;*
- *if possible place the sleeping verandah on the eastern side of the building and thus gain the benefit of the morning sun;*
- *avoid a common practice of wrongly planning the position of the bathroom and thus blocking the cool evening breeze from your sleeping verandah; and*
- *plan the kitchen away from the western side of the building if at all possible.”*

In the days before air conditioners, this 1916 advisory serves to illustrate the application of passive design principles in residential construction to increase a home's comfort and liveability in the Queensland climate.

Cooling is a major issue in tropical and sub-tropical climates, and appropriately insulated lightweight construction combined with good airflow provides for rapid cooling of the building envelope and subsequent internal temperatures.

In 2017, the Queensland Building Plan needs to take a more holistic approach to energy efficiency and greenhouse gas reduction in the construction industry by better recognition of passive design principles. This in turn may reduce the reliance and need for climate conditioned internal spaces and related energy demand.

Major flaw in Queensland Building Plan

TQ notes a large focus of the Discussion Paper and associated Fact Sheets on Sustainable Buildings is on operational energy efficiency, through such measures as the Nationwide House Energy Ratings Scheme (NatHERS) star rating scale, which assesses operational energy efficiency for new houses and units. Queensland complies with the Council of Australian Governments (COAG) commitment for 6-star houses and has retained a 5-star commitment for units.

Unfortunately, a major flaw in this type of building rating scheme is its limited approach to the assessment of the greenhouse gas implications from the production of different building products (i.e. amount of embodied energy involved).

This is a significantly missed opportunity in Queensland building policy to date.

For example, this issue was similarly identified in the Green Building Council of Australia's (GBCA) green star rating scheme, whereby life cycle analysis of building materials was previously ignored for no justifiable reason. The GBCA has recently released new consultation documents with proposals for green star points for the use of structural timber products in buildings, with additional points for timber products sourced locally.⁵

Better recognition of the environmental and low carbon economy benefits from the greater use of timber products in the built environment is also being adopted in many other local, national and international jurisdictions via wood encouragement policies (WEPs). These policies do not necessarily mandate the use of timber, but require its full consideration as a preferred choice of sustainable material when it is equally fit-for-purpose.

As an example, national governments (in countries such as New Zealand, Canada, France, Finland and the Netherlands) and many local governments in Australia (such as the Latrobe City [in Victoria] and Wellington [in NSW] councils), are adopting WEPs as part of their procurement practices to better capture the carbon abatement benefits of using more wood in building and construction.

In January 2017, the Fraser Coast and Gympie Regional Councils became the first two councils in Queensland to adopt WEPs as part of their building procurement framework.

These opportunities are particularly relevant in the context of mid-rise and multi-residential construction trends and changes to the National Construction Code (NCC), which now allows for deemed-to-satisfy timber construction up to 25 metres or around 8-storeys in height. The changes to the NCC allow buildings in Classes 2 (apartments), 3 (hotels), and 5 (offices) to be constructed using timber building solutions.

⁵ See: https://gbca-web.s3.amazonaws.com/media/documents/5.-structural-engineered-timber---consultation-paper-final_CUy7X3N.pdf



The other major benefit of better recognising the life cycle benefits of sustainable building materials, such as timber, is the flow-on effects for jobs and investment across Queensland.

Presently, there is market failure in building materials sustainability policy by the non-recognition of embodied energy impacts, which is impeding demand for timber products. With the right sustainable materials policy settings, the Queensland Building Plan could generate multiple GHG benefits by not only reducing the GHG footprint of buildings, but by stimulating downstream investment in new plantations that can sequester additional carbon emissions.

This potential is clearly identified in the GHG abatement measures curve on page 8 of the *Sustainable buildings Fact Sheet 1*, whereby land based abatement such as forestry is identified as a cost-effective abatement measure.

As an example, the planting of 10,000 hectares per year of new softwood plantation over the next ten years in Queensland, would capture and store an additional 15 million tonnes of carbon emissions over that period.

Policies that encourage new plantations can provide a win-win to the Queensland economy, by providing significant carbon sequestration as well as enhanced timber resources for use in the built environment.

Recommendations

TQ recommends that:

- the Queensland Building Plan ensure that building codes and energy rating schemes appropriately recognise the GHG benefits from the use of sustainable building materials (e.g. timber), particularly their low embodied energy compared to other substitute materials;
- greater consideration be given to passive building design principles and choice of building material (such as the use of lighter materials such as timber), that can reduce the need for climate conditioned internal spaces and related energy demand; and
- the State Government adopt a Wood Encouragement Policy (WEP) in light of these benefits, that aligns with the Queensland Building Plan.

Non-conforming building products

TQ has been working as part of an alliance of industry groups in Queensland to address the important issue of non-conforming products in the building industry.

The prevalence of non-conforming products (NCPs) is a major concern and TQ supports building policies that deliver consumer safety and mechanisms that can better support the industry in meeting its obligation to provide safer buildings. TQ supports the need to reform the current system to provide specifiers, purchasers, installers and certifiers with a clear mechanism to determine whether products are fit-for-purpose as defined under the National Construction Code. More must be done to remove NCPs at the point of sale and to proactively identify and remove from buildings NCPs that may slip through the net.

However, we do not necessarily need more regulation. There is already a robust National Construction Code (NCC) and related Australian Standards. The Australian government has developed quality conformance infrastructure setting out accreditation and verification paths using the Joint Accreditation System of Australia and New Zealand (JAS-ANZ) and the National Association of Testing Authorities (NATA). Industry is already doing a lot towards addressing the problem in building an extensive array of third party product certification schemes.

What is needed is effective compliance and enforcement measures at both a State and national level of the existing NCC and Australian Standards.

The Queensland Government has recently established the *Queensland Building & Construction Product Committee*. The Committee is currently the only centralised reporting mechanism for non-conforming products in Queensland and as such it has the potential to serve as a tool in capturing and sharing instances of NCPs. The Committee could play an essential role in ensuring that instances of NCPs are reported and addressed in Queensland. Queensland is not a closed market however, and to be fully effective the State government needs to be able to share and act on information across all Australian and even international jurisdictions.