

Submission to:
Meeting Future Demand: Australian Forest Products and Forest Industry

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Introduction

This submission is a response to the Forest Industry Advisory Council's Strategic Directions Issues Paper: Meeting Future Market Demand and discusses the ongoing development of Australian forest and wood products industry.

It discusses key aspects of the industry's current position before proposing future action, concentrating on industry's need for innovation, education and training and potential for supplying products and components to the building industry.

The key aspects of the industry's current position discussed are:

- Its structure.
- The reality of processing a renewable organic material.
- The industry's recent history – how it has come to this point.

Industry structure

The forest and wood products industry includes three distinctly different sectors occurring across two product supply chains that process output from three resource bases. The forest and wood products industry's sectors are:

1. The forestry sector, primarily concerned with growing and harvesting trees and delivering environmental services.
2. The wood product sector, primarily concerned with converting section of the tree into products suitable for markets.
3. The wood products fabrication sector, primarily concerned with converting forest products, such as sawn timber board, plywood or wood fibre, into artefacts, such as building, furniture and other items that satisfy society's needs.

The forest products industry's product supply chains, running across the sectors, are:

1. A solid wood products supply chain that manufactures products largely for use in the building construction industry.
2. A wood fibre products supply chain that converts logs unsuitable for milling into solid wood products and the residues from solid wood production into various fibre boards, cardboard, paper, and agricultural products and a range of chemicals and fuels.

The forest products industry's resource bases are:

1. A native forest resource supplying logs from mainly hardwood and some native pines species, such as cypress. This resource is generally managed for multiple uses of which log production is one.
2. A plantation softwood resource supplying logs from exotic pines, mainly radiata pine. This resource is primarily managed for sawlogs.
3. A plantation hardwood resource, predominantly Southern blue gum (*E.globulus*) and Shining gum (*E.nitens*) primarily managed for fibre production.

Each of these sectors and supply chains has its own perspectives, needs and issues. For examples, a producer of commodity pine framing will have a completely different set of needs and markets to a forester managing long-rotation native forests. Similarly, plantation pine foresters will have different views and perspectives to specialist architectural fabricators using appearance grade hardwoods. However, all three form part of Australian forest and wood products industry.

Given this, it is highly desirable that discussions recognise each of these areas of endeavor. Grouping them under a simple catchall term like 'forestry' is counterproductive. Similarly, considering each sector or supply chain in isolation is unhelpful as they are intrinsically interlinked. For example, any increased vitality in the solid wood products sector will largely depend on the capacity of the wood products fabrication sector to convert available and new products into useful artefacts and supply them to the building design and construction industry.

Processing a renewable organic material

The forest and wood products industry generally grows and processes a renewable organic material, drawn from a range of species, grown in a range of ecosystems. It is diverse resource generating an even more diverse product range.

Renewable organic materials are vital for any society meaningfully engaged with sustainable development. However, there are inherent characteristics of an industry involved in wood production, particularly one operating in a large, regionally and environmentally diverse country such as Australia.

Processing wood products in Australia employs a *reductive* production process regionally. Most competitor building materials, such as steel or concrete, are manufactured from non-renewable resources through *transformative* processes. *Transformative* processes take a base resource such as bauxite, apply large amounts of energy in a highly controlled and capital intensive facility, and change (*transform*) the resource physically into a different, generally homogeneous material. The resultant products are usually available in a limited range of grades, have predictable performance within a grade, and can be shaped to optimise their utility. Engineers are often involved to control the process. *Reductive* processes are significantly different. For timber, logs are cut or peeled (*reduced*) in relatively low energy and low capital processes into profiles useful for particular applications. The key characteristics of reductively produced materials are almost exactly opposite to those generated through transformative processes. Their properties are largely determined by the resource. With wood, they are anisotropic and irregular in the board and across boards.

The low energy and capital base of traditional wood processing encourages a producer profile still common in hardwood processing. It has a generally large number of small to mid-sized producers operated regionally near the resource with low need for technical interaction. For traditional milling, engineers and other professionals do not have to be involved to make a viable product. The plantation pine industry has moved past this profile. Softwood mills are technically complex and mid-high capital operations.

The industry's recent history

The industry's recent history naturally affects its capacity to capture market opportunities. Currently, the Australian forest products industry is adjusting to several major recent events:

- The breakup of the state-owned monopolistic log producers. Based in government with bureaucratic processes and regional political outlooks, these forestry organisations effectively crowded commercial industry involvement out of a role in effective policy formation, education and research direction. Their gradual (and continuing) demise has created a vacuum in each of these areas that the commercial sector is now realizing it has to fill.
- The managed investment scheme (MIS) program and its collapse. This program directed significant public and private resources into one industry sector and resource: plantation hardwood forestry. Again, this significantly distorted other sectors of the industry and its supporting infrastructure, and encouraged uneconomic behaviour. While significant areas of trees were planted, the resultant estate is primarily being grown for fibre and includes significant stranded and uneconomic stands.
- The regular buyout (or subsidy) of industry dependent on the state-owned native forestry resource when this resource is allocated to conservation objectives. This has generated investment uncertainty and dependence in some firms on a regular injection of public funds to maintain or reshape their equipment base.
- The global financial crisis (GFS) in 2008. In addition to effectively terminating the MIS program, most plantation hardwood forestry companies that depended on it, and many high-risk wood processing schemes, the GFS saw a large amount of processed wood from Europe and North America enter the international market. This drove down Australian wood prices and generated considerable stress for local producers. Returns are only now recovering.
- The pursuit of optimized commodity production by many major wood processors in the 15 years prior to GFC. The drive to commodity production increased efficiency

but effectively removed these producers from meaningful interaction along the supply chain into the wood products fabrication sector, where many had previously been active. This had several meaningful consequences. As commodity producers became 'order-takers', they:

- Did not need and had little interest in fostering technical expertise in the use of the material along the supply chain.
- Divested themselves of (or simply ran down) production of non-commodity items necessary to service a diverse building industry market. This removed both capital and expertise from the sector, and reduced its ability to meaningfully integrate with the building industry.

Each of these items has and continues to impact forest and wood products industry's ability to operate as an independent, resilient and competitive section of the Australian economy.

Vision and Objectives

1. What should the vision be for the forest products sector in the coming decades?

Society has needs for materials and services that the forest and wood products industry can provide.

The Australian forest products industry's vision should be to profitably satisfy society's need for materials and services through innovatively growing and processing trees, and supplying society with the broadest possible range of forest and wood products. Its three main product groups are:

- Environmental services, mainly generated by the forestry sector.
- Building and construction products, generated through the solid wood and fibre products supply chain.
- Cardboard, paper, fuel and chemical products, generated mainly through the fibre products supply chain

In practice, the industry's aims should to:

- a) Use wood to replace other materials – fossil fuels, steel, concrete, aluminium, plastic – taking advantage of its low embodied energy, positive carbon balance, and renewable nature.
- b) Manage production forests as an integrated part of the landscape, maximising their value not only in and of themselves but within the context of the agricultural, urban fringe, tourism and conservation landscapes of which they are a part.

2. What specific objectives should underpin this vision?

The specific objective underpinning this vision is to operate profitably, with the same broad relationship to governments as any other industry sector. Profitable operation implies an industry with robust:

- Technical capability
- Innovation both within companies and through more formal research, development and extension structures.
- Responsiveness to market demand and opportunity.

In practice, the specific objectives include:

- a) Diversification of product suite made from production forests – specifically engineered wood products for construction.
- b) Judicious use of biomass for heat and energy products and production
- c) Forest certification
- d) Increased integration of forestry with agriculture

Issue 1: Market trends and pressures, emerging uses and markets

The framing of questions around market trends and emerging uses and markets assumes that the industry has a balanced structure and can respond to these influences in an economically rationalist manner. This may not be the case.

They are also framed as if the industry is simply a commodity producer who can capture open international markets. This is certainly not the case with solid wood products whose demand is moderated by numerous independent participants, such as architects and builders, and controlled by complex regulatory and standards regimes.

1. What forest products does Australia have a local and/or international competitive advantage in producing?

The industry has established local market and obvious advantages in:

- Native hardwood architectural (appearance-grade) products – both solid wood and engineered/composites.
- Plantation exotic pine for domestic framing market.
- Plantation hardwood for domestic engineered wood products and biomass sectors. In time, this resource may be suitable for appearance grade engineered components

Most solid wood product consumption in Australia is directly related to the construction of buildings, furniture and similar items, particularly Class 1 buildings such as housing.

The structure and regulation of the Australian building sector creates a considerable comparative advantage for Australia's wood products and wood products fabrication sectors, particularly the structural products section. It has also led to the generation of considerable intellectual infrastructure for the wood products industry.

All structural building applications in Australia are regulated and regulatory compliance is generally defined as either compliance with a range of Australian standards or the demonstration of equivalent performance. Imported structural products that cannot demonstrate compliance with these standards cannot be legally used.

Standards compliance and standards generation has also created significant competitive advantages and intellectual capital for the Australian wood products sectors. Australia's house building standards for construction in termite, bushfire and cyclone-prone areas are some of the most advanced and 'user-friendly' in the world. For example, *AS 1684 Residential timber framed construction*, allows the design of structurally reliable building in conditions up to full cyclone exposure without an engineer. Coupled with wood treatment and other techniques, this could allow Australian producers and fabricators to supply reliable building solutions and related services through the cyclone and termite prone areas of Asia and the Pacific.

2. What is the potential demand for products in the coming decades?

The demand for wood products of all types from China, South-east Asia and India is likely to be very high. Potential demand is also likely to be very high locally as Australia will eventually need to get with the program on climate change

3. How can Australia best position itself for this demand, both nationally and internationally?

Industry can best position itself for this demand through pursuing profitable, competitive practice. Government can support this by treating the sector the same as other industry sectors, without undue subsidy or constraint.

Both industry and government can support profitable operation by

- Supporting genuine innovation, starting with the adaptation of international practice to Australian raw materials and conditions and adoption of that practice.
- Encouraging increased industry engagement with education and training – particularly in higher education and particularly around chemical engineering, and timber engineering and design.
- Addressing policy and regulatory frameworks so that timber use is supported and facilitated.

4. *What are the other drivers or disruptions that will potentially affect supply and/or demand?*

No comment at this time.

Issue 2: Emerging uses and markets

Questions about emerging forest products for Australia can be distracting. A far more useful question is how does the Australian forest and wood products industry become more technical capable, innovative, responsive to the opportunities that exist, and broadly profitable.

1. *Which emerging forest products have the greatest potential for Australia?*

Two broad groups of products are likely to have the greatest potential use or benefit for the Australian economy are:

- A broader product suite of engineered wood products and composites.
- An enhance product suite manufactured from hardwood residues.

In reality, these product groups align with resources from which greater value also needs to be extracted namely the plantation hardwood resource, and hardwood forestry and processing residues.

2. *What are some of the barriers to the development and/or uptake of these emerging forest products in Australia?*

Barriers to the uptake of these two broad groups are:

- a) The wood products fabrication sector's weakness in engagement with Class 2 to 9 building and the building design professions. Indicators of this include;
 - a. The lack of engineers and architects suitably trained in wood production and construction.
 - b. The lack of industry's understanding of and experience with the building sector responsible for delivering Class 2 to 9 buildings.
- b) High risks that exclude all but vertically integrated enterprises
- c) The commodity focus of production, principally about processing for materials for stick frame construction
- d) Little private sector investment in R&D from existing players.
- e) Minimal experience in commercial scale setting-up, so it is hard to match the potential investors with the opportunity

3. *What opportunities exist to better utilise wood resources?*

Opportunity to better utilise wood resources exist in the three different industry sectors, two product supply chains and three resource bases.

Critically, it could be held that we currently have the equivalent of butchering a steer, taking the eye fillet steak, and making sausages out of the rest. In most hardwood processing, board recovery is between 30-40% of log volume while the remaining residual 60-70% has relatively low utility in products in most areas. In pine production, board recovery is higher and residues have defined product streams but still significant volume of board has limited utility or profitability. This is poor business and understandably doesn't play well with the public. If we look elsewhere – parts of Europe for instance – it is very different.

However, identifying single opportunities for improvement can be a distraction to the wider goal of increased industry efficiency. We need to focus on the opportunities for profitable supply of material and services, adopt international and local best-practice and technology from elsewhere and modify it as required to meet our needs and raw materials.

We then have an opportunity to apply established technologies to make new products. We need to put these products together into systems (e.g. building systems) and export those systems into other markets.

To achieve this, we need

- a) A policy framework that encourages investors to consider using wood products.

- b) A regulatory framework that reduces the cost and risk of doing so compared to other materials.
- c) Professionals and tradesmen educated and trained in the use of these new wood products.
- d) With these in place, marketing.

Issue 3: Forest Resources

1. *What is required to ensure the plantation estate is able to meet future demand for forest products?*

The longevity of MIS-established forests is likely to vary regionally and by species. Given current trends, it is unlikely that:

- Not more than 60% of the *Eucalyptus globulus* estate will stay in production beyond initial harvest.
- The majority (if any) of the subtropical hardwood estate will not see another rotation.

By contrast, it is possible that, 90% of the *Eucalyptus nitens* estate will remain in production. In summary, the almost 1 million hectares hardwood plantation estate currently in the ground is likely to shrink to less than 700,000 hectares within ten years in the absence of further plantings or very changed markets.

Integration of plantations into agricultural landscapes, with benefits for both types of enterprise is the key to the future of plantations. The future is not the MIS model of wholesale broad-scale plantation expansion consuming agricultural landscapes. However, the estate cannot be as disaggregated as it was under MIS (particularly in places like Queensland). Regional scale processing (primary processing at least) will be a key to making the economics of this stack up as will quantitative and explicit benefits being shown to the agricultural side of the combined land use.

But the real key, particularly to the hardwood side of things, is a diversified product suite – engineered wood products – that do not require silvicultural or stand management interventions like thinning and pruning in order to achieve a product, as these interventions are simply too expensive to carry over a rotation for a commodity product, even an appearance grade one.

2. *What is required to ensure the native forest estate is able to meet future demand for forest products?*

The native forest estate needs to be used for specialty products. Eucalypts from native forests need to be valued as specialty timbers and sold to the international market at a premium. Suitable forest or processing residues should be used in engineered and composite appearance or specialty products – like the hardlam concept or, for instance, as face veneers (with plantation softwood or hardwood core veneers) for architectural or structural-architectural application. In the absence of such changes (continuation of low value use of sawlog residues and low price for the sawlogs themselves), social licence to continue harvesting will simply be unobtainable.

We need to have production forestry accepted as necessary to achieve the conservation and other (e.g. tourism) objectives of native forest management. But it is very difficult to achieve this when optimum value recovery is not achieved locally.

Climate change is the biggest driver we have for the need to continue to actively manage public native forest (including for production purposes). This is because:

- Changed climate will likely render much of the current approach to conservation of forests pointless.
- The use of forest products to substitute for energy and fossil-carbon intensive materials is a very real way that climate change can be mitigated.

However, if government is in denial about climate change and refuses to put in place regulatory and policy instruments to address it, then that opportunity is lost and hence so is the biggest driver to continued production from native forests.

3. *What opportunities are there to increase wood supply from farm forestry, private native forestry and indigenous and managed lands?*

There are enormous opportunities to increase wood supply from farm forestry, private native forestry and indigenous and managed lands. Forestry needs to be reimagined as another crop in the agricultural mixed business – whether that is in plantations or private native forests. As can be seen in Europe and New Zealand, there needs to be much closer integration and cooperation among those working with trees in those landscapes – forestry companies, farmers, NRM groups and others.

Issue 4: Innovation, research and development

As stated above, the Australian forest products industry's vision should be to profitably satisfy society's need for materials and services. Profitable operation implies:

- Technical capability
- Innovation both within companies and through more formal research, development and extension structures.
- Responsiveness to market demand and opportunity.

1. *What are the future research and development needs for Australia's forest products sector, and which of these needs are specific to strengths and opportunities in the Australian context?*

Technical capacity and innovation within companies requires a culture of appropriate expertise and regular review of practice. However, disruptions to many parts of the industry, particularly the hardwood growing and processing sectors, over the last decade have significantly undermined technical capacity in companies, limiting innovation, expertise and the quality of practice. In the hardwood and cypress processing sectors nationally, the need for effective extension and developments in and between firms is now very high. However, the capacity to deliver extension of this type to industry is low.

The profile of available researchers also limits Australia's capacity to deliver or support companies in the RD&E necessary to maintain a profitable industry. The numbers of experienced wood processing researchers in effective research groups and of independent timber support specialists in timber development associations are now very low.

The Australian forest and wood products industry is not going to develop to its potential unless it is supported by domestic research, development and extension (RD&E) capacity. Without that capacity, this industry isn't going anywhere.

The necessary RD&E capacity should be organised on the back of the existing university framework so that RD&E and education can all be addressed coherently and the existing intellectual and educational infrastructure/investment can be fully leveraged.

There needs to be much greater emphasis on supply chain integration and on the ultimate profitable uses of forest products. These aspects are driven by decisions in the design officer or the construction site for solid wood products, or in the operating building or manufacturing plant for biofuels or bio energy – not in the biorefinery or the sawmill.

Buildings systems research is probably the area where Australia has most export opportunity. In order for the industry to move into supply of building systems and system based service products, there is much product development work to be done, requiring engineers of various types, supply chain experts, ICT capability and design professionals.

From a forestry point of view, all the normal forestry discipline skills are needed and they should be applied to:

- Understanding, modelling and addressing risks associated with new and/or changing environments.
- Integration with agriculture.
- Resource characterisation for product development and value chain optimisation.

2. *What are the current inhibitors to private sector investment in research, development and extension and what role, if any, does the Australian government potentially have in addressing these?*

Currently, government policy and regulation rewards rent seeking behaviour. This removes the drivers for innovation, and without a need to innovate, there is no need for RD&E.

Each of the forest and wood products industry's major recent events, listed above, has helped to undermine industry's capacity to use RD&E, and reduce RD&E's importance to industry decision makers. Private companies (as a general rule) do not employ individuals who understand how to adopt R&D and change business processes for the company's benefit. If such a person does exist in a company, it is almost impossible for them to have a sufficient amount of their time set aside for R&D adoption to allow it to happen. If they do exist and have time, they are not sufficiently able to influence behaviour (adoption/change), normally due to their relatively junior status in the company hierarchy.

Industry decision makers often equate RD&E's importance with simple improvement in their own product manufacture. While this is important in a sector of industry striving for efficiency in commodity-based production, this approach undermines increased supply chain capacity and profitability. It ignores interconnectedness across industry sectors. In fact, when we compare the RD&E leadership in the industry from twenty years ago to the effective absence of capacity now, the difference is startling. An RD&E skill set is largely absent from company boards in the sector. Yet if we look at the mining sector one of Rio Tinto's seven chief/group executives is Group Executive for Technology and Innovation.

This lack of skill means appropriate emphasis is not given in company structures and adoption does not occur - because risks associated with R&D adoption are not understood and therefore executive teams are not supported.

3. *How can the framework for coordination Australian forestry research and development need to be strengthened?*

This question assumes that coordination of Australian forest and wood products research and development can actually be strengthened and that this will deliver benefits. Both of these assumptions are questionable. While RD&E coordination may have attractions in theory, it is very difficult to achieve in a diverse industry in practice. It is also a misconception that all forest and wood products stakeholders can or should work together to determine RD&E priorities. The sectors and the funding streams are simply too diverse.

Allocation of resources (cash and in-kind) will dictate RD&E objectives over time. So, coordination of RD&E will only occur if those providing resources agree and this is only likely if decision-making is confined to a tight group. This did occur for decades when state forestry organisations and major public research providers 'owned' coordination of the forest and wood products industry's R&D objectives through their participation in various government primary industry councils. They understandably aligned the industry's objectives with their own views or interests. They then funded the R&D, usually internally.

As those days are now gone, research allocation models will need to align more effectively to the funding source. The ACIAR Forestry program is a good one to consider as a guide to how to use public funds to effectively engage with the research community, foster collaboration and generate impact. The authors have been engaged with ACIAR under three Program Managers, for nearly 17 years, in nine countries, and whilst style and emphasis were different under each program manager, the robustness and success of the ACIAR approach continues to impress. It works and has worked for a long time. It is a useful model for allocating national public expenditure on forest or wood products and is likely to be most effective for long-term strategic questions, such as uses for plantation hardwoods and hardwood residues. A different allocation model is need for pooled industry and public resources. FWPA's role must be reviewed, enhanced and strengthened.

The idea that forest and wood products research priorities can be focused to align with the needs of a monolithic institutional model like FPInnovations is also unrealistic given Australia's diverse requirements. A more rugged approach is common in the US or European model where regional differences, the role of universities in research and education, and the

importance of private sector investment all come together to produce vibrant and relevant R&D that is sustainable long term.

Two general comment need to be made here:

- With models for forestry and forest products research coordination and investment within Australia and outside, including South Africa, Europe, United States, South America, New Zealand, Canada (just to name a few), why is every conversation about the way forward focussed on FPInnovations or SCION? There is much to learn from these organisations, but they are just research providers. An uncritical adoption of their approach, the absence of any analysis of other approaches as well as a naive acceptance that what works in Canada will work here is disappointing to say the least. We refer the reader to the FWPA report by Howard Burvill that identifies the Finnish model as the clear leader in international approaches to which Australia could look for ideas.
- The rhetorical question about whether Australia—as a small player in the global forest industry—should undertake its own research or acquire it from foreign providers is unhelpful. Australian industry faces problems both identical and completely separate to international growers and processors. Industry can transfer the results of international research to its problems where relevant. However, many research topics facing Australian industry are unique to this country and are most effectively handled by local researchers. Furthermore, without a vibrant domestic RD&E capacity, the skills to identify and adopt international RD&E results are lost to Australian industry.

Issue 5: Consumer and community engagement

1. How can domestic and international consumers be better engaged on the environmental, economic and social credentials of Australian forest products?

Australian customers have an established confidence in Australian forestry practice, particularly for structural pine products and most local hardwood production. Reinforcing this confidence reinforces brand quality. However, factors such as industry value and employment generation and innovation are equally important.

2. How important are consumer awareness programs to the future prosperity of the sector?

Important but encouraging an Australian forest and wood products industry that is more technical capable, innovative, responsive to the opportunities that exist, and broadly profitable is more important – see above under Issue 2.

You need a solid value proposition to sell before you worry too much about how to sell it.

3. Can forest certification be better leveraged to achieve stronger demand and better prices for Australian forest products and, if so, how?

Internationally, forest certification plays an important role in providing assurance to consumers and the supply chain on the sustainability and legality of the forest product they are purchasing. It is particularly relevant to internationally traded material and to species from countries with questionable forestry processes. It opens markets as pressure groups exploit the lack of certification to exert marketing leverage.

Australian governments regularly require (or encourage) use of certified products in their building projects and architectural professionals and timber suppliers servicing this market understand its importance for these projects.

However, most Australian consumers make little or no connection between forest certification and a price premium. Given this, chain-of-custody processes are usually limited to primary processors, millers. They are rare in the wood distribution sector, merchants and hardware stores, who are reticent to invest in chain-of-custody processes regarded as unnecessary by the bulk of its market. This situation is similar to internal commercial markets in many other countries.

Issue 6: Strengthened regional approaches

Encouraging coordinated approaches to wood resource and processing facilities is an understandable aim in regional and industry planning. Several wood producing 'centres' exist, usually around large pine resources. The Tuan / Maryborough, Tumut/Tumbarumba and Mt Gambier are obvious examples of hubs or at least workable concentration.

However, it is difficult to understand why a discussion on hubs is included in this paper.

A new hub requires a concentrated resource available for additional diverse processing. Australia doesn't have such a resource. The native forest hardwood and plantation pine estates are well established and their processing facilities exist, some in hubs and some in regional grouping. Relocating those facilities to form new hubs is not a viable option. The plantation hardwood estate is a new resource but has been established largely for fibre. It has to be rationalised before it can be regarded as being available for additional diverse processing. Any new facilities, if they are built, may reinforce existing production concentration.

3. How could forestry hubs better utilise resources and promote greater efficiencies and innovation?

The hardwood forestry sector has an extraordinarily poor supply chain management capability – particularly in the forestry side of things. Pine processing is much, much better but still poor when compared to other sectors, even in primary industries. Hubs are an opportunity to start addressing this, but are also hard to establish or make effective within the constraints of the current lack of supply chain sophistication. Note the focus of the new ARC Centre for Forest Value.

4. What have been the barriers to the establishment and efficient operation of forestry hubs to date, and what might be the role of the Australian Government in addressing these?

Barriers could include:

- The lack of resource concentration.
- Established commercial infrastructure.
- Government subsidies for poor business practice and propping up of industry that fails to invest in innovation or adopt innovative practice that is available freely.
- Lack of technical expertise (processing/manufacturing/engineering) to bring venture capital together with business opportunities
- Significant capital barriers to investment.
- Lack of access to raw materials due to long term contracts with monopoly government supplies.
- Sovereign risk due to environmental activism.

5. If additional forestry hubs are to be established, where would they best be located?

An important point here about hubs is that people often want to establish them in regional centres that have been left economically and socially bereft by the downsizing of the forestry and forest products sectors. This is understandable. However, a key to hubs (as with everything else) is attracting the right *people* to drive the innovation and collaboration. It can be very hard to attract these people to poor regional centres. It is also useful to ask, 'what are the competitive advantages of establishing a hub in Regional Centre A?' Consequently the level of investment and the security of the venture needs to be established (and be high on both counts) in order to be attractive to a critical mass of people necessary to drive it.

Because of this, it is best to build where there is a core already. And this is a recurring theme through this and other attempts to envision a new forest sector in Australia. There is not enough money to start things from scratch. So let's look at the various foundations or platforms that exist and see if there is an opportunity to build on those – institutional, regional, expertise etc.

Issue 7: Infrastructure

1. *What infrastructure will be required to respond to future demand for Australian forest products?*

No comment here

2. *What can be done to ensure better recognition and understanding of the sector's infrastructure needs?*

No comment here

Issue 8: Industry skills and training

1. *What are the skills and training needs of the sector over the coming decades, and what are the current gaps?*

This is a critical area. As one industry colleague recently described, an unskilled and uneducated industry will have no place in the Australian economy. However, the briefing paper summarises the industry skill and training position well. In short, the industry is dangerously underskilled.

Trade-certificate training is weak and important areas are not covered or only have limited availability. Most formal training focuses on forest harvesting or mill operations. However, for reasons stated above, the processing sector prefers non-transferable in-house training to transferable certificate-level training. Topics important to the wood products fabrication and supply sectors are very poorly covered in formal trade training. At a tertiary level, education in forestry is in decline and unviable in most universities, while tertiary level education in timber production, building and design is in its infancy.

Additional skills are needed across the board but particularly in:

- Building design professionals such as:
 - Architects and engineers interested in timber design and construction.
 - Quantity surveyors and builders, capable of costing and assembling timber-rich projects.
- Process and chemical engineering and industrial chemistry
- Forestry – for native forests particularly (plantation foresters to some extent can be bought from overseas).
- Silvicultural science and wood technology.

2. *Are Vocational Education and Training and university training providers well-positioned to meet the future skills and training needs of the sector?*

Yes, they are. However, there is no market signal for them to invest in these areas and as they are market driven organisations it will take an industry or government intervention to address this. There is also a lag time of five - ten years before improvement will be evident.

Online training delivery will be an important feature of future education and training. This is probably the only way of effectively servicing the industry's basic training needs.

3. *What improvements are required at an enterprise level to support the recruitment, development and retention of the sector's current and future workforce?*

No comment here.