Final Report
Investment and Innovation Pathways in the Victorian Hardwood Processing Industry

Prepared for
Victorian Association of Forest Industries
Level 2, 2 Market Street, Melbourne VIC 3000

42807563
Project Manager:  
Lyndall Bull  
Principal Consultant  

Principal-In-Charge:  
Andrew Morton  
Vice President  

Author:  
Duncan MacLeod  
Senior Associate  

Reviewer:  
Andrew Morton  
Vice President  

© Document copyright of URS Australia Pty Limited.

This report is submitted on the basis that it remains commercial-in-confidence. The contents of this report are and remain the intellectual property of URS and are not to be provided or disclosed to third parties without the prior written consent of URS. No use of the contents, concepts, designs, drawings, specifications, plans etc. included in this report is permitted unless and until they are the subject of a written contract between URS Australia and the addressee of this report. URS Australia accepts no liability of any kind for any unauthorised use of the contents of this report and URS reserves the right to seek compensation for any such unauthorised use.

Document delivery

URS Australia provides this document in either printed format, electronic format or both. URS considers the printed version to be binding. The electronic format is provided for the client’s convenience and URS requests that the client ensures the integrity of this electronic information is maintained. Storage of this electronic information should at a minimum comply with the requirements of the Commonwealth Electronic Transactions Act (ETA) 2000.

Where an electronic only version is provided to the client, a signed hard copy of this document is held on file by URS and a copy will be provided if requested.
Table of Contents

Executive Summary ......................................................................................................................... x
A blueprint for innovative action........................................................................................................ xi
Summary of strategic innovation opportunities .................................................................................. xii
Managing innovation risk factors ..................................................................................................... xix
1 Introduction ................................................................................................................................. 1
  1.1 About innovation ..................................................................................................................... 2
  1.2 Outline of the project ............................................................................................................... 2
2 Overview of Victorian Hardwood Processing Industry ................................................................. 5
  2.1 Sawlog processors .................................................................................................................. 5
  2.1.1 Geographical distribution of sawmills ............................................................................... 6
  2.1.2 Sawmill configuration ....................................................................................................... 7
  2.1.3 Sawmill production and recovery ..................................................................................... 8
  2.2 Pulpwood processors ............................................................................................................ 9
3 Victorian Forest Resource Profile ................................................................................................. 13
  3.1 Historic harvest volumes ....................................................................................................... 14
  3.2 Victoria’s public native forests ............................................................................................... 15
    3.2.1 VicForests operations ...................................................................................................... 15
    3.2.2 Other public native forest harvest ................................................................................... 21
  3.3 Victoria’s private native forests .............................................................................................. 22
  3.4 NSW public native forests ...................................................................................................... 23
  3.5 Hardwood plantations ............................................................................................................ 23
  3.6 Softwood plantations .............................................................................................................. 25
4 Hardwood Markets and Product Trends ....................................................................................... 27
  4.1 Macro trends in the wood products industry ......................................................................... 28
  4.2 Review of existing hardwood markets ..................................................................................... 34
    4.2.1 Sawn timber for building construction ............................................................................. 36
    4.2.2 Furniture ............................................................................................................................ 43
    4.2.3 Joinery and mouldings ..................................................................................................... 45
    4.2.4 Niche timber markets ....................................................................................................... 46
    4.2.5 Pulp and paper .................................................................................................................. 47
    4.2.6 Woodchip exports ............................................................................................................ 49
Executive Summary

4.3 Review of new or emerging hardwood markets .......................................................... 52
  4.3.1 Engineered strand lumber and board products ..................................................... 53
  4.3.2 Cross Laminated Timber ...................................................................................... 55
  4.3.3 Veneer and plywood ............................................................................................ 57
  4.3.4 Bioenergy and biofuels ....................................................................................... 61

5 Supply chain and industry competitiveness ................................................................. 69
  5.1 Breakdown of the Victorian hardwood supply chain .............................................. 69
  5.2 Competitiveness ..................................................................................................... 72
    5.2.1 Factors affecting competitiveness ..................................................................... 72
    5.2.2 Status of the industry’s competitiveness ......................................................... 75
    5.2.3 Price competitiveness of hardwood timber products .......................................... 78
    5.2.4 Improving the industry’s competitive position .................................................. 78

6 Developing a Climate for Innovation .......................................................................... 80
  6.1 Types of innovation ............................................................................................... 81
  6.2 Fostering a climate for innovation ......................................................................... 81
    6.2.1 An innovation framework for the Victorian hardwood processing industry ....... 81
    6.2.2 Fostering innovation within the enterprise ....................................................... 84
  6.3 Education and skills development ......................................................................... 85
  6.4 The role and value of collaboration ...................................................................... 86
    6.4.1 Clusters .............................................................................................................. 89
  6.5 Forestry and innovation ......................................................................................... 91
    6.5.1 Innovation and the Victorian hardwood processing industry ......................... 91

7 Opportunities for Innovation in the Victorian Hardwood Processing Industry .............. 94
  7.1 Summary of strategic innovation opportunities ....................................................... 94
    7.1.1 Resource-related opportunities ....................................................................... 95
    7.1.2 Market-related opportunities ......................................................................... 96
    7.1.3 Processing and competitiveness-related opportunities .................................... 99
    7.1.4 Opportunities for developing a climate for innovation ................................... 100
    7.1.5 Managing innovation risk factors .................................................................... 101
  7.2 A blueprint for innovation in the Victorian Hardwood Processing Industry .............. 103
Executive Summary

7.2.1 Recommendations for the Victorian hardwood processing industry .........................103
7.2.2 Recommendations for enterprises .............................................................................105

8 References .................................................................................................................. 107
9 Limitations .................................................................................................................. 111

Tables

Table 2-1 VicForests' sawlog customers by sawmill capacity, 2012/13 ................................. 6
Table 2-2 Victorian hardwood production mix, 2010/11 .................................................... 8
Table 2-3 Average hardwood sawmill recovery rates, 2010/11 ........................................... 9
Table 3-1 Properties of key Victorian hardwood species .................................................. 20
Table 3-2 Management of public native forest species by the Department of Primary Industries, 
2011/12-2013/14 (m$^3$; unless otherwise stated) .......................................................... 21
Table 4-1 Engineered Strand Lumber – review of key development considerations .......... 54
Table 4-2 Cross Laminated Timber – review of key development considerations ............... 56
Table 4-3 Plywood and Veneer – review of key development considerations ..................... 60
Table 5-1 Outline of supply chain linkages for various products ........................................ 70
Table 5-2 Estimated number of Australian hardwood sawmills by indicative scale .......... 76
Table 5-3 SWOT analysis of sawmilling cost position ......................................................... 79
Table 5-4 SWOT analysis of pulp and paper cost position .................................................. 79
Table 6-1 Approaches to collaboration ............................................................................... 87
Table 7-1 Resource related strategic innovation opportunities ............................................ 95
Table 7-2 Market related strategic innovation opportunities ............................................... 96
Table 7-3 Processing and competitiveness related strategic innovation opportunities .......... 99
Table 7-4 Climate for innovation related strategic innovation opportunities ....................... 100
Table 7-5 Factors that may impact innovative options ....................................................... 101

Figures

Figure 2-1 Appearance product out turn from Victorian mills ........................................... 8
Figure 2-2 Map of VicForests customers, 2012-13 .............................................................. 11
Figure 3-1 Sawlog harvest volume by state ....................................................................... 14
Figure 3-2 Pulplog harvest volume by state ....................................................................... 15
Figure 3-3 Proportion of VicForests current harvest by species by Forest Management Area ... 16
Figure 3-4 Ash sawlog medium term outlook .................................................................. 17
Executive Summary

Figure 3-5  Ash sawlog long term outlook ................................................................. 17
Figure 3-6  Mixed species sawlog medium term outlook ........................................... 19
Figure 3-7  Mixed species sawlog long term outlook ................................................... 19
Figure 3-8  Forecast Victorian hardwood plantation log supply .................................... 24
Figure 3-9  Plantation regions .................................................................................... 25
Figure 3-10  Forecast Victorian softwood plantation log supply .................................... 26
Figure 4-1  Apparent consumption of timber and housing commencements in Australia......... 28
Figure 4-2  Apparent consumption of hardwood timber in Australia .............................. 28
Figure 4-3  Global industrial roundwood production ................................................... 29
Figure 4-4  Global tropical log exports ......................................................................... 29
Figure 4-5  Asian hardwood sawn timber imports by destination country ......................... 30
Figure 4-6  Distribution of hardwood sawn timber production ...................................... 30
Figure 4-7  Chinese hardwood sawlog imports by source .............................................. 32
Figure 4-8  Chinese hardwood sawn timber imports by source ........................................ 32
Figure 4-9  Indian wood product imports by value ....................................................... 32
Figure 4-10  Value of Australian alterations and additions ............................................. 38
Figure 4-11 Quarterly Australian imports of hardwood sawn timber ............................... 38
Figure 4-12 Australian LVL apparent consumption ..................................................... 40
Figure 4-13 Australia structural timber price trends ...................................................... 40
Figure 4-14 Hardwood flooring timber price trends ...................................................... 42
Figure 4-15 Chinese exports of wooden furniture ......................................................... 44
Figure 4-16 Australian imports of wooden furniture ..................................................... 44
Figure 4-17 Value of Australian imports of wooden mouldings by source country ............ 46
Figure 4-18 Apparent consumption of printing and communication paper in Australia .......... 48
Figure 4-19 Chinese paper & paperboard production by type ........................................ 50
Figure 4-20 Chinese hardwood chip imports by source country ..................................... 50
Figure 4-21 Quarterly CIF price of hardwood chip exports to China (US dollars) .............. 51
Figure 4-22 Global plywood production ....................................................................... 57
Figure 4-23 Apparent consumption of plywood in Australia .......................................... 58
Figure 4-24 Australian plywood nominal price index .................................................... 59
Figure 4-25 Australian electricity production .................................................................. 62
Figure 5-1  Schematic of sawmill supply chain scenarios .............................................. 71
Figure 5-2  Porter’s ‘five forces’ of industry competitiveness ............................................ 72
Executive Summary

Figure 5-3  Change in the cost of wood products manufacturing ..................................................... 77
Figure 6-1  Ingredients for successful innovation .............................................................................. 82
Figure 6-2  What are alliances? ........................................................................................................ 87
Executive Summary

VAFI has engaged URS Australia Pty Ltd to undertake a project titled “Investment and Innovation Pathways in the Victorian Hardwood Processing Industry”. This report presents the findings of the project. In particular, it summarises a range of innovation opportunities and maps out potential pathways to support investment and innovation in the Victorian hardwood processing industry and to support the long-term sustainability of the industry. It is intended to provide a blueprint for processing enterprises and the broader industry to assess options for innovation that will address key profitability and growth challenges and be a basis for an industry wide coordinated approach to innovation.

The report evaluates qualitative and quantitative information on the Victorian forest resource, the existing Victorian hardwood processing industry, the state of play in existing and emerging forest product markets and trends in key cost and value drivers. It also presents a range of key principles and ideas for enabling a culture of innovation in the industry.

The native hardwood processing industry in Victoria has undergone a period of contraction and consolidation over the last decade which has included a decline in the number of sawmills operating and in the volume of timber products produced. A key driver for the contraction of the hardwood processing industry has been the decline in resource availability. Other factors that have contributed to the change include changes in log specification, increasing production costs, impact of bushfires, the transition from a licence system to a market based system and a more challenging competitive environment with the increasing supply of softwood timber products.

After going through a significant period of change, the Victorian hardwood processing industry is now at a turning point. While existing markets still provide profitable opportunities for processors, over the last decade profitability in the industry has generally declined. As a result, now is an appropriate time for the industry (both collectively and as individual enterprises) to consider its strategic position.

There are a significant number and range of innovative opportunities available to both new investors and the existing industry to add value or reduce costs in existing operations or supply brand new markets with Victorian hardwood products. There are also considerations for the industry to make regarding how it should respond to current challenges whilst also improving the climate for, and understanding of, innovation within the industry, as a means of ensuring long term competitiveness.

The following presents findings from the report beginning with the blueprint for innovative action in the hardwood processing industry. A breakdown of strategic innovation opportunities is then provided encompassing:

- Forest resources;
- Products and markets;
- Supply chain and competitiveness; and
- Developing a culture of innovation.

The final section summarises a range of risk factors that will influence the success of innovation in the industry.
A blueprint for innovative action

The report provides three succinct and overarching recommendations for the Victorian hardwood processing industry and three recommendations for enterprises to consider respectively.

Industry-level innovation

1. Develop an industry wide co-ordinated approach to innovation. As part of this approach, commit to exploring between 1-3 innovation options for the industry in the short term

The Victorian hardwood processing industry would benefit from developing a co-ordinated approach to innovative action which would aim to:

- Increase the understanding of, and climate for, innovation within the industry;
- Develop a structured and successful approach to innovation management;
- Identify current and potential sources of ideas for innovation utilising a disciplined, collaborative process involving a range of participants such as local industry, scientific and technical experts both familiar and unfamiliar to the industry and people from the forest products industry from outside either the state or Australia. Sources of ideas should incorporate relevant actions identified by this and relevant previous reports and inquiries undertaken for the forest industry;
- Utilise innovative frameworks that are known to assist with the successful development and implementation of innovation (e.g. as outlined in Section 6.2);
- Develop action plans for the development and implementation of innovations; and
- Provide ongoing opportunities for networking opportunities for the industry to continue to identify a range of innovation options.

2. Strengthen the industry’s social licence to operate

The long term success of the industry requires the support of the community, and the Government, to ensure that it can both operate in the short term, and provide surety of access to resource in the long term. The industry will only be able to make significant investments into improving its productivity and product offerings if it enjoys such community and political support.

Industry needs to support efforts to improve their social licence to operate by conducting both responsible business practices, working with their suppliers and their customers, and providing support to enable industry associations (e.g. VAFI, AFPA, FWPA), to lobby on their behalf and maintain programs such as the ‘Wood Naturally Better’ campaign.

3. Identify opportunities for improving the climate for innovation within the hardwood processing industry

The work carried out for this report has identified that while there is an appetite for innovation and potentially doing things differently (i.e. working more collaboratively), there is a great need to both improve the understanding of, and climate for, innovation in the industry. Industry representatives (e.g. VAFI, FWPA) should take responsibility to discuss with relevant agencies and organisations such as the Victorian Department of Business Innovation and Enterprise Connect the range of relevant services that they offer. In the case of Enterprise Connect, examples include the ‘Researcher in
Business’ program and understanding the role it played in the development of the Geelong Food Co-Operative Cluster. In the case of the Department of Business Innovation it would include its understanding of broader Government grant programs (e.g. Business Victoria’s Manufacturing Productivity Network Grants).

**Enterprise-level innovation**

1. **Undertake a business review**
   This report has identified a large range of options for enterprises to consider for improving their competitiveness. It is pertinent as part of any process to improve a business’s competitive position that due consideration is given to the fundamentals of business management such as strategy, human resources, financial management and marketing. If it has not already occurred, prior to making large scale changes to their business, managers should undertake a business review (ideally utilising somebody external to the business) to identify opportunities for improvement. One approach to doing this may be to engage with Enterprise Connect which offers a business review service.

2. **Participate in the industry’s co-ordinated approach to innovation**
   Building on the momentum developed around innovation as a result of both this report and other current industry initiatives, there is an opportunity to build a sustainable approach to identifying, analysing and implementing innovation within the industry. Enterprises should take part in any co-ordinated approaches that are developed. This will not only serve to assist with improving the competitiveness of the industry as a whole but will improve an enterprise’s understanding of innovation, offer important networking opportunities and deliver ideas for innovation that may be applicable at both the enterprise and/or industry level.

3. **Develop a structured approach to identifying, analysing and implementing innovation (product, process or business) within the enterprise**
   This report has identified a wide range of innovations that enterprises within the Victorian hardwood processing industry can consider adopting. The most appropriate way for an enterprise to assess ideas for innovation is to have an effective ‘idea system’ complemented by a structured approach to identifying, analysing and implementing innovation. Box 7 -2 outlines the elements of an effective idea system as well as the ‘Stage Gate System’ for moving new product ideas to launch via a series of activities (stages) and decision points (gates). While this process was developed for product innovations, there is no reason why the general approach and principles could not be applied to both process and business systems innovations.

**Summary of strategic innovation opportunities**

This project identified a wide-range of options for innovation in the Victorian hardwood processing industry. The following section provides an overview of those opportunities.
Summary of strategic innovation opportunities

Forest resource related opportunities

The Victorian forest estate is comprised of public and private native forest and hardwood and softwood plantations.

Public native forests managed by VicForests provide the largest hardwood log resource to the Victorian hardwood processing industry. VicForests harvests around 23 different eucalypt species from its operations, the four largest volume species being mountain ash (*Eucalyptus regnans*; 32% by volume), alpine ash (*E. delegatensis*; 28%), messmate (*E. obliqua*; 12%) and silvertop ash (*E. sieberi*; 8%).

Timber production from private native forests in Victoria is currently a small industry. A 2006 summary of PNF harvest estimated an annual private native forest harvest in Victoria of 77,000m$^3$. There is limited information on the species or log grades produced from private native forests. Further developments are required to better understand the spatial extent and productive potential of the private native forest resource, and to assist landowners in managing and marketing their resources, and meeting regulatory requirements.

There may also be resource opportunities in adjacent NSW forests which are managed by Forests NSW. There is reported to be around 40-50,000m$^3$ of ash and mixed species forest in the Tumbarumba region, much of which is currently unallocated.

There are around 206,000 ha of hardwood plantations and around 226,000 ha of softwood plantations in Victoria. Softwood plantations are predominantly radiata pine (*Pinus radiata*) and hardwood plantations are predominantly Tasmanian blue gum (*E. globulus*) (ABARES, 2012c). Softwood plantations are generally managed to produce sawlogs over a 30-35 year rotation. The majority of hardwood plantations were established over the last 15 years through managed forest investments and are managed over short rotations (8-12 years) to produce wood fibre for paper production.

Based on URS’ analysis the following opportunities were identified that were related to optimising the use of the forest resource:

- Identify innovative products and processes to deal with the higher incidence of gum vein within the Ash resource;
- Improve log allocation/merchandising processes, particularly for C grade Ash logs, to ensure that logs are sent to mills that can maximise the value of sawn timber products produced from these logs;
- Investigate the feasibility of some changes to the VicForests grade specifications for C grade Ash logs;
- Identify new markets and increase utilisation of mixed species sawlogs in Central Highlands;
- Identify potential new processing options and markets for the residual resource across the Working Forest Area;
- Develop an investment memorandum to attract investors for processing the residual forest resource across the Working Forest Area;
- Research the suitability of different species within the mixed species resource for different processing applications;
- Data collection to better understand the spatial extent and productive potential of the private native forest resource;
Summary of strategic innovation opportunities

- Extension is required to assist private landowners in managing and marketing their resources, and meeting regulatory requirements; and
- Consider options for industry to process the currently unutilised public native forest near Tumbarumba NSW, to supplement Victorian hardwood log supply.

For further detail on these opportunities and background information, see Section 3.

Product and market-related opportunities

Sawn timber production has been the product mainstay of the Victorian hardwood processing industry since its early development. Timber has been used for a large number of important applications from building, packaging, furniture and joinery, and a range of other end uses. The construction industries and in particular the residential construction industry has been a critical driver of the industry over time.

There have been a number of shifting trends in wood products markets over the last 20 years including:

- Greater availability of lower cost alternatives to hardwood timber, particularly in structural products where competition from softwood timber and laminated veneer lumber has been fierce over the last 20 years;
- The growth of demand in China and other Asian countries and a corresponding shift in the international production of wood products, particularly secondary value added products such as furniture;
- The ongoing impacts of the global financial crisis which has contributed to strengthening the Australian dollar, increasing the volume of softwood products imported, and supressing the housing market; and
- Increased focus on the sustainability and legality of wood products in the developed world.

Hardwood product and market opportunities identified as part of this report included capitalising further upon the durability and aesthetic appeal of Victorian hardwoods, and marketing the sustainable, legal and ‘eco-friendly’ characteristics of Victorian hardwood products, particularly with end customers.

The following sub-sections note a range of innovation opportunities by product sector. For further detail on these opportunities and background information, see Section 4.

Sawn timber innovation opportunities

- Explore options to maintain competitiveness in flooring and decking timber, through using lower cost materials and production processes to enable a more compelling product offering e.g. engineered flooring;
- Explore options for supplying greater volumes into the decking and privacy screen markets through either durable mixed species timber or potentially H3 treated ash timber;
- Investigate the development of fit for purpose structural systems such as frame and truss and sub-flooring systems that can be made to order as a value added secondary product;
- Explore the range of ‘product improvement’ innovations that could be made to existing products including standardising flooring dimension specifications and taking advantage of technological developments such as powder coating; and
- Consider standardising the dimensions of flooring products to improve the substitutability and
Summary of strategic innovation opportunities

reliability of the industry’s product offering, particularly given the relatively limited availability of mixed species.

**Furniture innovation opportunities**
- Improve the recognition and, ideally the demand for, Australian timber furniture amongst Australian consumers;
- Explore opportunities for niche, high grade, specific furniture products that are based on local production and a strong relationship between designer and manufacturer; and
- Explore opportunities within the production process of value added products, for outsourcing elements of the production process.

**Joinery and mouldings innovation opportunities**
- Assess the potential for re-allocating structural grade product into a higher value markets using innovative processing and/or marketing approaches;
- Explore opportunities for creating market demand for locally made, high quality, specifically designed joinery, mouldings, windows and doors; and
- Explore opportunities for additional pre-fabricated product options e.g. stairs.

**Pulp and paper innovation opportunities**
- Explore opportunities for further expansion of the Maryvale mill;
- Explore opportunities for investment in productivity improvements or further improvements to environmental performance and community engagement; and
- Explore opportunities for improved branding of paper products produced from Australian forests to demonstrate and reinforce the product’s environmental credentials relative to competitors.

**Woodchip export innovation opportunities**
- Enterprises involved in the export of woodchips could explore opportunities to increase their export volumes to China.

**Emerging product innovation opportunities**
- The industry could consider conducting a feasibility study to further assess the suitability of producing engineered strand lumber, cross laminated timber and plywood and veneer (or other products) from Victorian hardwood logs (native and plantation). Depending on the outcome of the study, the industry could assess whether it invests in any necessary research that would be required to develop these products from Victorian hardwoods and/or the appropriateness of the development of an investment memorandum to try and attract investment interest in the building of such a facility in Victoria;
- Explore opportunities for generating electricity from woody biomass;
Summary of strategic innovation opportunities

• Continue to lobby government for recognition of bioenergy produced from native forest residues within the RET legislation;

• Explore opportunities for producing wood pellets from native forest residues for export until such time as there is more favourable policy in Australia; and

• Continue to keep abreast of, and participate in, research focussed on producing biofuels from forest products.

Supply chain and competitiveness opportunities

Depending on the product being produced, the supply chain for the Victorian hardwood processing industry can vary quite widely. Supply chains can impact the industry’s competitiveness through the:

• Cost of additional linkages (e.g. distributors) between the producer and the end user, including the margins paid to distributors;

• Logistical challenges, including the effectiveness and efficiency of product transfer, handling and sales and marketing challenges; and

• Closeness of the producer to their customers as far as understanding the changing needs of the end user.

Based on URS’ analysis the following supply chain opportunities were identified:

• As a result of changes in the timber retailing sector there are opportunities to increase the percentage of hardwood timber products that are sold directly to end users; and

• Consider outsourcing/offshoring elements of the production process, particularly where primary production and sales and marketing of the end product can be retained.

For further detail on these opportunities and background information, see Section 5.1.

For hardwood processors already operating in the Victorian market, competitiveness is the extent to which they can produce their products more profitably than their competitors. In the case of F17 for instance, this reflects the unit margin a mill can make on a standard piece of timber relative to other mills. Sawmills that are competitive with relatively low production costs generally are not only more profitable but have more flexibility in their pricing strategies against competitors.

Competitiveness can be influenced by a wide range of factors including changes in the cost of production, changes in the competitive of substitute products, and other factors such as exchange rates, freight costs and industry organisation and information sharing.

Based on URS’ analysis the following opportunities were identified to improve the competitiveness of the Victorian hardwood processing industry:

• Developing industry capacity to process plantation resources could occur through either a new sawmill or retrofit of existing sawmills;

• Consider options for consolidating disparate sawmilling operations and re-investing in processing efficiency;

• With the exception of processors producing niche products, enterprises should consider increasing scale to improve profitability;

• Consider options for automating the production process through the introduction of technologies
Summary of strategic innovation opportunities

such as scanners and stackers; and

- Consideration of the development of ‘processing hubs’ (i.e. clusters) particularly for high, grade niche products.

For further detail on these opportunities and background information, see Section 5.2.

Opportunities for developing a climate of innovation

Successful development of innovation requires a mix of natural, human and capital resources, coupled with an effective process for initiating ideas and applying or commercialising them. Figure 1 provides a practical and logical framework for the Victorian hardwood processing industry to utilise for the effective development of innovations.

By combining the following ingredients, innovation can be a success:

- **Expertise** – new discoveries, new knowledge, and new insights come from all people who are given the resources necessary for success;
- **Interaction** – face to face is still very important for the exchange of ideas and synergy that creates new business models, marketing plans, or products;
- **Diversity** – ideas will only get better when they are openly discussed and considered by a mix of people with a variety of research fields, backgrounds, approaches, and mind-sets; and
- **Application** – ideas are useless unless used. The true proof of their value is in commercialisation.

![Figure 1: Ingredients for successful innovation](image)

Crespell and Hansen (2007) undertook a study of business level cultural factors that foster creativity and innovation and influence business performance in the forest products industry. In summary, the study found that climate for innovation and innovation strategy had a very strong bearing on a company’s innovativeness and innovativeness in turn had a strong effect on business performance.
Summary of strategic innovation opportunities

Resistance to change was found to be the main impediment to innovation.

Implications from the study for wood products managers included:

- Firm performance can be improved by being innovative;
- A firm’s structure and functions should be integrated with innovation processes including allocating the resources and creating channels for ideas generation and implementation, while promoting a culture favourable to change. This includes championing the principle of innovation, lowering employee resistance to change and creating the appropriate mechanisms for continuous learning, improving and creating;
- Reinforcing a management style of support and camaraderie that can be replicated by middle managers with floor employees can improve innovation uptake;
- Setting clear and common goals and principles can develop cohesion;
- Stimulating exploration and risk taking and allocating the time and resources to do so creates an environment where employees are more open to change; and
- Exploring different types of innovation such as organisational, markets and information technology.

Complementing these frameworks is the work by Roos (2011), who asserts that successful manufacturing businesses that operate in highly competitive, high cost business environments are typically:

- Highly niche;
- Highly knowledgeable;
- Focussed on products as well as services that accompany them;
- Managed by people that are highly experienced in the industry;
- In close cooperation with customers;
- Innovative in value creation & value appropriation; and
- Strongly linked with knowledge institutions.

By adopting these positional factors, hardwood processing enterprises can transition away from producing products that compete on price to enterprises that work more closely to understand their customer’s needs.

Effective leadership and management are also considered vital for firms to effectively utilise the skills within their organisations to identify opportunities for innovation. The skills that are required for innovation may be learned on the job however the basis for the knowledge associated with identifying, creating, and implementing innovation are typically based on formal training, both within the higher education (i.e. university) and VET sectors (Australian Workforce and Productivity Agency, 2012).

Based on URS’ analysis the following opportunities were identified to help develop a culture of innovation within the industry:

- Integrate an innovation framework utilising the elements of expertise, interaction, diversity and application into an industry wide co-ordinated approach to innovation;
- Embrace the documented business level cultural factors that foster creativity and innovation;
- Consider whether the enterprise utilises the documented critical positional factors. Where appropriate integrate guidelines developed by Roos (2011; outlined above) into the enterprise’s approach to business;
Managing innovation risk factors

- Led by Forestworks and supported by the training institutions, confirm and/or develop workforce planning and development initiatives that ensure that the industry is supported by employees with the necessary technical and management skills, complemented by a comprehensive understanding of innovation;
- Consider the range of opportunities that exist for the industry to integrate a more collaborative approach into the way it carries out its business; and
- Consider the development of industry clusters e.g. for the development of a mixed species niche product development in the Central Highlands region.

For further detail on these opportunities and background information, see Section 6.

Managing innovation risk factors

Table 1 summarises risk factors that could impact the innovation processes. The factors assessed relate to technology, investment, policy, management and personnel. The processing industry should consider approaches to addressing these risks when implementing the blueprint for innovation.

<table>
<thead>
<tr>
<th>Category of influence</th>
<th>Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technology</td>
<td>Access to knowledge about technologies that may enable enterprises to improve their processes</td>
</tr>
<tr>
<td></td>
<td>Capacity within the research sector to support research and development of new technologies that may assist to improve the competitive position of the industry</td>
</tr>
<tr>
<td>Investment</td>
<td>Access to adequate capital, at an appropriate interest rate, to enable adoption of new processing technologies</td>
</tr>
<tr>
<td></td>
<td>An understanding of the range of approaches that might exist to support capital investment e.g. joint-ventures, government assistance</td>
</tr>
<tr>
<td></td>
<td>Access to adequate funding sources to research and address elements that may inhibit the ability for a technology to be adopted</td>
</tr>
<tr>
<td></td>
<td>Access to capital to undertake extensive and thorough feasibility analyses of new processing options</td>
</tr>
<tr>
<td>Policy</td>
<td>Surety of resource to justify investment in innovation</td>
</tr>
<tr>
<td></td>
<td>Support of the industry (at both community and government levels) is required to ensure government funding is made available for industry services such as extension</td>
</tr>
<tr>
<td></td>
<td>Adequate capital to support campaigns (e.g. FWPA’s Wood Naturally Better campaign) that aim to improve the support and ‘social licence’ for products made from Australian forest products</td>
</tr>
<tr>
<td></td>
<td>Access to high quality education programs at the university and VET level</td>
</tr>
<tr>
<td></td>
<td>Policy that supports the production of bioenergy from native forest residues</td>
</tr>
<tr>
<td>Management, leadership and personnel</td>
<td>Capacity to understand the technology that is being considered for implementation</td>
</tr>
<tr>
<td></td>
<td>Appropriate process/es for identifying, assessing and implementing new product, process or business systems innovations</td>
</tr>
</tbody>
</table>
Managing innovation risk factors

<table>
<thead>
<tr>
<th>Category of influence</th>
<th>Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A culture that enable ideas for innovation within the enterprise to be openly shared, assessed and implemented</td>
</tr>
<tr>
<td></td>
<td>Leaders that are committed to developing a climate for innovation across the industry</td>
</tr>
<tr>
<td></td>
<td>A culture that is open to managing and processing the resource differently to how it has in the past, including outsourcing parts of the production process</td>
</tr>
<tr>
<td></td>
<td>Where investment in new processing technologies are made, enterprises will need to train their workforce in the skills required to proficiently utilise and manage them</td>
</tr>
<tr>
<td></td>
<td>People in managerial positions that understand, or have the capacity to understand alternative approaches to production, e.g. making high end, fit-for purpose products that utilise a strong relationship between designers and manufacturer</td>
</tr>
<tr>
<td></td>
<td>Staff that understand the economics of the processing so as to appropriately manage any decisions around outsourcing/offshoring</td>
</tr>
<tr>
<td></td>
<td>Strong and effective relationships should exist across the supply chain, e.g. between forest manager and processor or processor and designer to allow for more sophisticated solutions to problems to be developed</td>
</tr>
<tr>
<td></td>
<td>Effective succession plans</td>
</tr>
</tbody>
</table>
Introduction

The native hardwood processing industry in Victoria has undergone a period of contraction and consolidation over the last decade. The number of hardwood sawmills has significantly declined. A key driver for the volume contraction in the hardwood processing industry has been the decline in resource availability as a result of State Government forest policy decisions and through the impact of large bushfires. According to the Victorian Association of Forest Industries (VAFI), the transition from a licence system to a market-based auction system in the Victorian industry has also driven processor consolidation.

Having undertaken a significant degree of rationalisation and re-structuring, the Victorian hardwood processing industry is now at a turning point. Although for current processors there are still profitable markets to supply Victorian hardwood products, including structural timber and furniture, processors have been faced with declining levels of demand for the past 20 years. This is predominantly due to newer and lower cost substitutes for hardwood products (sometimes sourced internationally). Challenging market conditions combined with increasing operating costs, have constrained investment opportunities in the industry.

Despite this, the industry has stabilised. There are now a significant number, and range of opportunities for innovation, to improve value or reduce costs in existing operations or supply brand new markets with Victorian hardwood products. There are also considerations for the industry regarding how it should respond to current challenges, whilst at the same time understanding and creating opportunity for innovation within the industry, as a means of ensuring long term competitiveness.

URS Australia Pty Ltd (URS) was engaged by VAFI in July 2012 to undertake a project titled “Innovation and Investment Pathways in the Victorian Hardwood Processing Industry”. The aim of the project is to assess recent changes in the Victorian hardwood industry, and report on options and pathways for the industry to innovate, to improve its viability and competitiveness, for the longer term.

This project corresponds with Action 10.1 of the Victorian State Government’s Timber Industry Action Plan (TIAP; Department of Primary Industries, 2011) to engage in research and development in the area of industry productivity and innovation. It aims to support the ability of businesses to engage with future sales mechanisms and wood supply offerings (TIAP 1.3, 3.1 and 2.2).

The project also supports the Victorian State Government’s new manufacturing strategy as described in “A more competitive manufacturing industry: New directions for industry policy and manufacturing” (Department of Business and Innovation, 2011). This project supports the Victorian Government’s objective of moving Victorian-based manufacturing industries to more highly productive positions in the economy, specifically through:

- A more rapid uptake of productivity enhancing measures;
- Greater adoption and application of new technologies;
- Fewer gaps in skills and capabilities in manufacturing firms;
- Better market support for smaller manufacturers; and
- Greater industry collaboration and information-sharing.

This project is also consistent with the Victorian Government’s new directions in industry policy, including:

- A comprehensive agenda to raise productivity;
- A focus on individual enterprises; and
1 Introduction

• More support for innovation and market opportunities.

1.1 About innovation

Innovation is a concept used regularly to describe newness, or change. Although it is often associated directly with the invention of new products, its broader meaning is simply associated with doing something differently to achieve a better or more efficient outcome. The Shorter Oxford Dictionary (1972) provides a useful, though broad definition of innovation that highlights the importance of newness and change:

‘the act of innovating to change into something new, to renew, the introduction of novelties; the alteration of what is established; something newly introduced; a novel practice or method’.

The Organisation for Economic Co-operation and Development (OECD) and Eurostat provide a more detailed definition of innovation in its Oslo Manual which sets guidelines for collecting and interpreting innovation data (OECD/Eurostat, 2005):

“the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organisational method in business practices, workplace organisation or external relations.”

1.2 Outline of the project

This report reviews key elements of the Victorian hardwood industry, presenting a baseline view on the industry’s development to date, including key changes that have impacted competitiveness in recent years. A range of innovation opportunities are assessed within each element of the industry to address challenges and bottlenecks, and realise emerging opportunities. Realising these opportunities will assist the industry to improve its competitive position and maximise the value derived from a changing hardwood forest resource. The innovation opportunities identified include both enterprise and industry level opportunities.

To initiate the project, a workshop was held on Friday 3 August 2012 for the hardwood processing industry and relevant stakeholders to discuss innovation opportunities and pathways for the industry’s development. The workshop was attended by approximately 40 industry members and stakeholders including 12 hardwood processing enterprises. The workshop produced a wide range of findings on potential options for innovation, and on innovation pathways. Guest speakers also presented case studies from a range of industries that showed innovation in action.

A number of hardwood processors and industry associations were contacted subsequent to the workshop, to obtain further comment on innovation in the processing industry.

The information obtained during the combined sessions was compiled by URS, and has been incorporated where applicable, into this report.

Structure of this report

The report is split into chapters: Chapters 2-5 form a background discussion of innovation opportunities; and Chapters 6 and 7 discuss the role of innovation and pathways by which the innovation opportunities could be implemented.
1 Introduction

The following points provide a brief summary of each Chapter:

- **Chapter 2** – outlines the current state of the Victorian hardwood processing industry – its recent development, structure and scale;
- **Chapter 3** – profiles the Victorian forest resource, particularly the volume, location and key resource characteristics, including for the key Victorian native hardwood species.
- **Chapter 4** – outlines the major market opportunities available to Victorian hardwood processors. This includes opportunities available in markets that are currently supplied but also new and emerging markets for the hardwood resource that could hold potential for new investment.
- **Chapter 5** – assesses the characteristics of the Victorian hardwood product supply chain and considers the advantages that some products have in the alternative supply chains that they bring. The chapter also reviews the competitive position of the Victorian hardwood processing industry and considers what processing investments and configuration changes could be made to improve processing efficiency;
- **Chapter 6** – broadly discusses the role of innovation and presents an innovation framework and outlines the importance of an innovative culture to harness business opportunities; and
- **Chapter 7** – presents and prioritises the range of innovative options for the Victorian hardwood processing industry that were developed throughout the investigation. It provides key recommendations at both the industry and enterprise levels and identifies key pathways for each to enable the industry to harness the potentially significant benefits that an industry culture that embraces innovation, can provide.
Overview of Victorian Hardwood Processing Industry

This Chapter contains an overview of the Victorian hardwood processing industry (the ‘industry’). The industry is comprised of sawmills that produce a range of forest products such as flooring, furniture, and structural timbers, as well as pulpwod processors that produce paper products or export woodchips. Section 2.1 contains an overview of the hardwood sawlog processors, including the geographical distribution of sawmills, typical sawmill configuration and trends in the products produced by sawmills. Section 2.2 provides an overview of pulpwod processors.

<table>
<thead>
<tr>
<th>Summary of Victorian hardwood processing industry</th>
</tr>
</thead>
<tbody>
<tr>
<td>• The overall size of the Victorian hardwood processing industry has declined over the last decade, in line with reducing resource supply. The ash processing sector is consolidated into a smaller number of sawmills processing larger volumes, while the mixed species sector contains a large number of small sawmills.</td>
</tr>
<tr>
<td>• The Victorian sawmilling industry includes a broad range of sawmill configurations, from large sawmills operating on a two shift basis with new capital investment in technology developments and with a focus on producing primarily kiln-dried appearance and structural products; to small older style mills operating on a one shift basis with capital costs reflecting depreciated values.</td>
</tr>
<tr>
<td>• Sawmills in Victoria tend to either focus on maximising the output of appearance grade products, or maximising the output of structural products and minimising operating costs.</td>
</tr>
<tr>
<td>• Sawmills in Victoria are not geared to process plantation sawlogs. Capacity to process plantation resources would need to be developed through either a new sawmill or retrofit of existing sawmills.</td>
</tr>
<tr>
<td>• Victorian sawmills produced around 217,000 m$^3$ of sawn timber products from E+ sawlogs in 2010/11, including around 58,000 m$^3$ of appearance grade products. The broad split of production between structural and appearance grade products has been relatively stable for several years now.</td>
</tr>
<tr>
<td>• One notable trend is the production of finger jointed F17 in place of traditional F17 timber lengths. Finger-jointed F17 is typically made from ash and is used for lintels, bearers, roof beams and other high strength requirements. This innovative product provides a way to better utilise increasing volumes of short and lower quality timber and compete directly with the growing supply of softwood LVL.</td>
</tr>
<tr>
<td>• Pulpwood markets form a vital part of the forestry value chain, helping to increase the value generated by the forest resource. VicForests sells around 1.2 million m$^3$ of pulpwod (residual logs) each year (VicForests, 2011). Victoria’s largest pulpwod consumer is the Australian Paper, pulp and paper mill at Maryvale, Central Gippsland.</td>
</tr>
</tbody>
</table>

2.1 Sawlog processors

The sawmilling industry in Victoria can be roughly divided into two categories – sawmills that process ash logs and sawmills that process mixed species logs$^1$. Table 2-1 summarises the number of companies receiving sawlogs from VicForests, and the relative level of sawlog intake.

Currently, there are about 21 sawmills that process predominantly D+ sawlogs, and another four companies that process predominantly E-grade sawlogs. There is a notable difference between the

---

$^1$ See Section 3. Mixed species is a category classified by VicForests that includes a combination of native hardwood species including Messmate, Silvertop, Cottail and stringybark species.
2 Overview of Victorian Hardwood Processing Industry

Ash and mixed species processing sectors. The ash processing sector is consolidated into a smaller number of sawmills processing larger volumes, while the mixed species sector contains a large number of small sawmills.

Since 2004/05 the number of sawmilling companies that received sawlog supply from VicForests has declined from 48 to the current number of around 25. This contraction of the industry has been driven principally by the reduction in resource availability, but also indirectly through the pricing and allocation systems being used to supply logs for processing.

### Table 2-1  VicForests’ sawlog customers by sawmill capacity, 2012/13

<table>
<thead>
<tr>
<th>Sawmill sawlog intake volume (m³ pa)</th>
<th>Ash D+ sawmills</th>
<th>Mixed species D+ sawmills</th>
<th>Ash and mixed species D+ sawmills</th>
<th>E+ sawmills¹</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;10,000</td>
<td>7</td>
<td>3</td>
<td>1</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>10,000-50,000</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>2</td>
<td>11</td>
</tr>
<tr>
<td>50,000-100,000</td>
<td>1</td>
<td>1</td>
<td></td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>&gt;100,000</td>
<td>1</td>
<td></td>
<td>1</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>3</strong></td>
<td><strong>11</strong></td>
<td><strong>7</strong></td>
<td><strong>4</strong></td>
<td><strong>25</strong></td>
</tr>
</tbody>
</table>

Source: VicForests  
¹ E+ sawmills predominantly process E grade sawlogs

A small number of sawmilling and firewood processing operations also occur across some small areas of productive public forests throughout Victoria. Arbuthnot sawmill, located in Koondrook on the Murray River, processes high quality Victorian river red gum sawlogs for a range of product applications including marine grade timbers (ports, wharves and bridges) and heritage timber replacement².

2.1.1 Geographical distribution of sawmills

Figure 2-2 shows the geographic location of Victorian sawmills. The map shows the widespread distribution of sawmills across the eastern half of Victoria. The three largest ash sawmills are located in Noojee, Heyfield and Bairnsdale. The location of these mills generally aligns with the location of the ash resource which is primarily sourced from the Central Highlands region (resource availability is discussed in detail in Section 3).

The mixed species processing sector is focussed in the East Gippsland region. The three largest mixed species sawmills are located in this region around Orbost and Cann River. There is also a medium sized mixed species sawmill in Eden in southern NSW. Historically, large volumes of mixed species sawlogs were sourced from the East Gippsland region, and the mixed species processing sector established in this region in alignment with resource availability. However supply of mixed species sawlogs from the East Gippsland region has declined over time, and is expected to continue to do so. Conversely, latest resource forecasts indicate that increased volumes of mixed species sawlogs are available in the Central Highlands region than previously forecast (see Section 3.2 for more detail).

At the present time, VicForests is transporting some mixed species resources from the Central Highlands region to sawmills in East Gippsland in order to fulfill contracted sales commitments. The processing capacity of sawmills in East Gippsland is around 100,000 m³ per annum, however, as

2 Overview of Victorian Hardwood Processing Industry

discussed in Section 3.2.1.2 the sustainable level of sawlog availability in East Gippsland is only 50,000 m$^3$ per annum.

2.1.2 Sawmill configuration

Sawmill configurations and technologies vary depending on a range of factors including: the nature of the input resource (sawlog input volumes, log quality and log sizes); the products being produced; and levels of capital investment. The Victorian sawmilling sector includes a broad spectrum of sawmill configurations, from large sawmills operating on a two shift basis with new capital investment in technology developments and with a focus on producing primarily kiln-dried appearance and structural products; to small older style mills operating on a one shift basis with capital costs reflecting depreciated values. There are also several sawmills in Victoria that are focussed on processing E-grade sawlogs for the production of lower quality (sub-F8) products.

Sawmills in Victoria, particularly ash mills, typically have two different approaches to processing:

1. Maximising the output of appearance grade products. Structural products are the fall down product, although still very important to the overall cost recovery. These mills tend to have higher operating costs.

2. Maximising the output of structural products and minimise operating costs.

Mixed species sawmills tend to fall into the smaller, lower capital end of the sawmill spectrum. Most of the small mixed species mills have a greater focus on structural timber, and the medium sized mixed species sawmills produce a combination of structural and appearance grade products.

Native forest sawmills are usually equipped with a single saw log break down system, followed by resawing lines. These systems have developed over many years to process native forest resources and are well suited to the highly variable size and quality of native forest logs as the sawing pattern can be altered to account for the particular attributes (size, taper, defect) of each log.

At present, there are no hardwood sawmills in Victoria that are specifically geared to process plantation logs. A 2011 report for the CRC for Forestry identified two options for the development of hardwood plantation sawlog processing capacity:

1. Construction of a new plantation based hardwood sawmill, specialising in processing shorter and more uniform logs. A world-scale competitive mill would require an annual log input of around 80-100,000 m$^3$ per annum. Capital investment for a new sawmill processing around 100,000 m$^3$ per annum on a two shift basis would be in the order of $23M$ (Washusen and Harwood, 2011).

2. The ‘retrofit’ of existing native forest sawmills with processing components that improve mill performance when sawing plantation logs. This would enable smaller volumes of plantation logs to be processed. Depending on the nature of the resource and the existing sawmill configuration, this may require the installation of a new resawing line, such as a hew saw, and possibly some alteration to the log break down system to produce consistent dimensions for the resawing line.

The development of additional sawmilling capacity either in native sawlog or plantation sawlog processing will be contingent on securing adequate resource supply in an appropriate location for processing.

---

3 Infrastructure $0.9M, sawmill $10.2M, drying systems $9M and drymill $3.5M
2 Overview of Victorian Hardwood Processing Industry

2.1.3 Sawmill production and recovery

Victorian sawmills produced around 217,000 m$^3$ of sawn timber products from E+ sawlogs in 2010/11. Table 2-2 shows the split of timber products produced. This broad split of products has been relatively stable for several years now. However one notable trend is the production of finger-jointed F17 products in place of traditional F17 timber lengths. Finger-jointed F17 is typically made from ash and is used for lintels, bearers, roof beams and other high strength requirements. This innovative product provides a way to better utilise increasing volumes of short timbers and compete directly with the increasing use of softwood LVL for high strength requirements in residential construction. It has also provided a way to work around some of the increasing incidence gum vein in C-grade ash. There are currently two sawmills that produce finger-jointed F17 in Victoria.

C grade logs contain both structural and appearance grade timber. As discussed in Section 3.2 the incidence of gum vein in C-grade logs is expected to increase, which may have the effect of reducing the recovery of appearance grade timber and forcing mills without finger-jointed facilities to cut larger volumes of F17.

### Table 2-2 Victorian hardwood production mix, 2010/11

<table>
<thead>
<tr>
<th>Sub-F8</th>
<th>Structural</th>
<th>Appearance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Palings</td>
<td>Battens</td>
<td>F8</td>
</tr>
<tr>
<td>----------</td>
<td>----------</td>
<td>-----</td>
</tr>
<tr>
<td>4,000</td>
<td>4,700</td>
<td>17,400</td>
</tr>
<tr>
<td>68,300</td>
<td>22,100</td>
<td>64,300</td>
</tr>
<tr>
<td>72,300</td>
<td>45,400</td>
<td></td>
</tr>
</tbody>
</table>

Source: WPV (2011)

Note: Sub F8 is predominantly produced from E grade logs.

Figure 2-1 compares the production of appearance grade products from 2004/05 to 2010/11. While total production levels of appearance grade products have only declined slightly in line with reducing resource availability, there has been a shift in volume from furniture manufacture to production of staircases, windows and doors, and other products.
2 Overview of Victorian Hardwood Processing Industry

Sawmill recovery

Hardwood sawmill recovery rates in Victoria are mid-range on average compared to other Australian states. Table 2-3 shows the average hardwood sawmill recovery rates for the main hardwood sawlog processing regions. Softwood sawmills tend to have higher recoveries of around 50-55% due to the more uniform nature of softwood plantation resources.

Table 2-3  Average hardwood sawmill recovery rates, 2010/11

<table>
<thead>
<tr>
<th>State</th>
<th>Recovery rate*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Victoria</td>
<td>39.5%</td>
</tr>
<tr>
<td>NSW</td>
<td>40.6%</td>
</tr>
<tr>
<td>Queensland</td>
<td>36.5%</td>
</tr>
<tr>
<td>Western Australia</td>
<td>41.0%</td>
</tr>
<tr>
<td>Tasmania</td>
<td>33.9%</td>
</tr>
<tr>
<td>Australia</td>
<td>38.6%</td>
</tr>
</tbody>
</table>

Source: ABARES (2012a)
*Based on green-off-saw volume of sawnwood output

2.2 Pulpwood processors

Pulpwood is the non-sawlog component of the forest harvest that is generally used for fibre-based processing operations where typical value drivers of timber (e.g. strength, appearance characteristics) are of lower importance. Pulpwood markets form a vital part of the forestry value chain, helping to increase the value generated by the forest resource. Pulpwood markets can be diverse ranging from large scale pulp manufacturers, engineered timber and panel manufacturers and bioenergy plants, to smaller scale firewood merchants, and landscaping companies.

VicForests sells around 1.2 million m$^3$ of pulpwood (residual logs) each year (VicForests, 2011). Victoria’s largest pulpwood consumer is the Australian Paper pulp and paper mill at Maryvale, Central Gippsland. The Australian Paper mill produces a range of printing and writing paper using a combination of native and plantation sourced wood fibre. Midway, based out of Geelong and South East Fibre Exports (SEFE) based out of Eden, NSW, are also significant consumers of Victorian pulpwood. These companies export native hardwood chip to pulp mills in the Asia-Pacific.

In addition, South West Fibre in Portland in south west Victoria, also operate a woodchipping facility that exports plantation hardwood and softwood chips to international customers, sourced from nearby Green Triangle and central Victorian plantations.
Victorian Forest Resource Profile

This section analyses the availability of forest resources in Victoria. Section 3.1 provides a summary of historic sawlog harvest volumes in Victoria. Section 3.2 provides a resource outlook for ash and mixed species sawlogs from Victoria’s public native forests, and presents a summary of the wood properties of key Victorian hardwood species. Section 3.3 examines the availability of private native forest resources in Victoria and Section 3.4 looks at native forest resources that may be available from south east NSW. Section 3.5 and Section 3.6 review resource availability from Victoria’s hardwood plantations and softwood plantations respectively. A summary of key points from the section are outlined in the box below.

**Summary of forest resource opportunities and risks for hardwood processing industry**

**Ash resources**
- Victoria’s public ash resource is shifting towards the harvest of more secondary regrowth (1950/60’s) and later logging and fire regrowth. Harvesting in ‘transitional’ forests will increase, with the overall expected effect being that the ash sawlog resource becomes smaller and has increased occurrence of gum vein.
- Impacts for sawmills will arise from the need to deal with the higher incidence of gum vein, which will reduce recovery of appearance grade timbers, particularly from C-grade sawlogs.
- The opportunity and challenge for the processing sector is to adapt to the changing ash resource through innovative products and processing options.
- As the industry adapts to the changing resource, there may be opportunities to improve log allocation/merchandising processes, particularly for C-grade logs, to ensure that logs are sent to mills that can maximise the value of sawn timber products produced from those logs. This may include the opportunity to investigate the feasibility of some changes to the VicForests grade specifications for C-grade logs.

**Mixed species resources**
- Latest resource forecasts indicate that increased volumes of mixed species sawlogs are available in the Central Highlands region than previously forecast. At present, there are limited markets for this resource in the Central Highlands.
- Conversely, there is an undersupply of mixed species sawlogs in East Gippsland relative to sawmill processing capacity in the region.
- There is an opportunity to identify new markets and increase utilisation of mixed species sawlogs in Central Highlands, and a challenge to adapt to lower resource levels in East Gippsland.

**Residual resources**
- A large volume of residual resource is available across the Working Forest Area. There is an opportunity to attract investment in new facilities to process this resource.
- If a market for this resource can be found it is likely that harvesting efficiencies and access to sawlogs will increase and the economics of harvesting marginal forest areas will be improved.
- Further research may be required to determine the exact suitability of species for different processing applications.
3 Victorian Forest Resource Profile

**Summary of forest resource opportunities and risks for hardwood processing industry (continued)**

**Complementary resources**
- There may be potential to produce larger volumes of wood products from private native forests in Victoria. Further developments are required to better understand the spatial extent and productive potential of the private native forest resource, and to assist landowners in managing and marketing their resources, and meeting regulatory requirements.
- Forests NSW harvests around 40-50,000 m$^3$/annum of sawlogs from the Tumbarumba region which is currently unallocated and could be available for purchase by Victorian processors.
- Victoria has significant hardwood and softwood plantation resources. There may be opportunities for plantation resources to complement native forest resources in plywood and laminated veneer lumber production, composite wood products (e.g. MDF), pulp and paper production and bioenergy.

### 3.1 Historic harvest volumes

The production of native forest sawlogs in Australia has declined steadily over the last decade largely as a result of government policies to increase forest reserve areas, and to a lesser extent by other factors such as bushfires. The decline has been felt most notably in Victoria, NSW and WA (Figure 3-1) and has led to a contraction of the native forest processing sector in these jurisdictions. This has reduced the supply of sawn timber into the Australian market and created opportunities for importers to trade internationally produced sawn timber from neighbouring countries in the Asia-Pacific.

Australia’s softwood plantation estate is now mature and sawlog harvest volumes have been relatively stable in Victoria and across Australia since around 2005.

*Figure 3-1  Sawlog harvest volume by state*

Source: ABARES (2012b)
3 Victorian Forest Resource Profile

The decline in native forest harvesting across Australia has led to an overall decline in native pulplugs harvesting (see Figure 3-2). This decline has been driven by reductions in harvesting in Tasmania, while native forest pulplugs harvest volumes have remained relatively stable in Victoria for the last decade. As native forest pulplugs harvesting has declined, Australia's hardwood plantation estate has been maturing and harvest volumes have increased rapidly (see Figure 3-2).

Figure 3-2  Pulplog harvest volume by state

![Figure 3-2: Pulplog harvest volume by state](image)

Source: ABARES (2012b)

There is the potential for further decline in native forest harvest volumes around Australia. In Victoria, sustainable volumes have been affected by bushfires and are expected to decline around 2030 (Section 3.2 contains resource outlook for public native forests in Victoria). The Queensland Government intends to cease harvesting in south east Queensland in 2025. Until recently, Tasmania appeared to be a relatively consistent region for native forest harvest volumes; however, recent negotiations as part of the Tasmanian Forest Agreement indicate that the area available for forest harvest may decline.

3.2 Victoria's public native forests

The majority of Victoria's public native harvest is undertaken by the Victorian Government's forest management enterprise, VicForests. VicForests' operations are largely focussed around the Central Highlands and East Gippsland forest regions. Some commercial and non-commercial forest management is also undertaken by the Victorian Department of Primary Industries (DPI; formerly managed by the Department of Sustainability and Environment) – this includes firewood production and some sawlog and speciality timber production from small areas of public native forest.

3.2.1 VicForests operations

VicForests produce an annual resource outlook which identifies the availability of high quality sawlogs (D+ grade sawlogs, referred to hereafter as ‘sawlogs’) from Victoria’s State forests in the medium and long term. VicForests’ medium term resource outlook estimates the availability of ash and mixed species resources in the Central Highlands and East Gippsland regions over the period from 2012 to 2034 (regions are shown in Figure 2-2).
3 Victorian Forest Resource Profile

VicForests harvests around 23 different eucalypt tree species from its operations. The four predominant species by volume are mountain ash (*Eucalyptus regnans*) 32%, alpine ash (*E. delegatensis*) 28%, messmate (*E. obliqua*) 12% and silvertop ash (*E. sieberi*) 8%. Figure 3-3 shows the break-up of the species harvested in each Forest Management Area.

![Figure 3-3 Proportion of VicForests current harvest by species by Forest Management Area](image)

The resource outlook is modelled by VicForests using a variety of systems and techniques. Native forest resource modelling is always subject to some uncertainty due to the inherent difficulty in modelling growth in natural systems and then overlaying a range of other constraints such as operational forest management and environmental conditions. VicForests is currently developing a new approach to estimating resource availability and this is expected to result in information relating to a broader range of forest products being available in the future.

3.2.1.1 Victorian ash

The Victorian ash resource consists of a combination of alpine ash (*E. delegatensis*) and mountain ash (*E. regnans*) both valued by the processing industry and its customers for the production of high quality wood products and structural timbers.

VicForests’ medium term ash outlook shows a sustained level of ash sawlogs of around 300,000 m³ per annum until 2028/29 and then a sharp decline, particularly in the Central Highlands region (Figure 3-4). This reduction in availability is predominantly caused by the delayed effects of three major bushfires that have occurred in Victoria since 2003. The long term outlook predicts some recovering in ash sawlog availability from around 2044 (Figure 3-5).
Some notable changes in the log size and quality of the ash sawlog resource are starting to occur and are expected to continue in the future. Ash sawlog resources are being increasingly sourced from ‘transitional’ forests (where ash and mixed species forests meet) and from secondary regrowth (1950/60’s). Sawlogs from these areas will be of smaller diameter and may have increased gum vein. As the transition to smaller sawlogs and an increased incidence of gum vein continues, there will be implications for the sawmilling sector, particularly sawmills processing C-grade logs. C-grade logs
contain a combination of appearance grade and structural grade timbers. As the incidence of gum vein in C-grade logs increases, the recovery of appearance grade timber, which is more valuable than structural timber, will decline. In addition, smaller diameter sawlogs will reduce the recovery of larger dimension boards during the sawmilling process. The processing sector will need to find opportunities to adapt to the changing ash resource – a market analysis for appearance and structural grade timbers is provided in Section 4 that provides further information on product opportunities.

As the ash resource changes, and depending on adaptation strategies implemented in the processing industry, it will be important to ensure that logs are sent to mills that can maximise the value of sawn timber products produced from those logs. Sawmills which focus on maximising production of appearance grade products may value a small C-grade log with no gum vein higher than they would value a large C-grade log with gum vein, whereas sawmills that focus on the production of structural timber are better equipped to handle large logs with gum vein. There is also an opportunity to investigate the feasibility of some changes to the VicForests grade specifications. Small clean C-grade logs could be segregated as a separate grade or included in B-grade.

3.2.1.2 Mixed species

Along with Victorian ash species, VicForests also harvest a significant volume of ‘mixed species’ resource. This resource comprises around 21 species including messmate, silvertop ash, cut-tail, mountain grey gum, stringybark species and peppermint species.

The volume of mixed species predicted to be available in the Central Highland region has increased from previous forecasts to around 130,000 m$^3$ per annum. This is a result of improved fire severity mapping which has identified less forest as being affected by the 2009 bushfires (Figure 3-6). There will be another step down in mixed species sawlog availability around 2029 before a longer term recovery to higher levels (Figure 3-7).

There has been substantial change in the mixed species resource available for harvest over the last decade, particularly in East Gippsland where sawlog availability has declined and there has been a trend of decreasing log size. The VicForests medium term resource outlook for mixed species indicates that there will be one more step down in sawlog availability in East Gippsland to a yield of 50,000 m$^3$ per annum. This will occur over the next two to three years. VicForests expect the quality of mixed species logs produced in East Gippsland to remain relatively stable in the future, although there is some uncertainty on the effects of long term drought on timber quality.
3 Victorian Forest Resource Profile

Figure 3-6  Mixed species sawlog medium term outlook

Figure 3-7  Mixed species sawlog long term outlook

Source: VicForests (2012)

NB: The long-term outlook illustrates broad level volume trends rather than accurate predictions of future harvest levels. For this reason, the results have been presented on a relative rather than absolute scale.

3.2.1.3 VicForests’ residual resource

Approximately 837,000 tonnes per annum of residual logs is available for allocation in addition to current commitments from VicForests’ Working Forest Area. Residual logs, which are also referred to

4 The Working Forest Area is the area of State forest in eastern Victoria available and potentially suitable for ongoing timber production.
as pulplogs, are logs below E-grade sawlog quality. In early 2012, VicForests undertook a process titled “Purchase and Processing of Hardwood Residual Timber”, designed to offer the residual resource to the market and attract existing and new customers to the resource. This proposal identified potential processing opportunities for this resource, including:

- Pulp and paper manufacture;
- Biomass including production of pellets, and other renewable energy products (gas or liquid);
- Engineered wood products; and
- Carbon products.

The process is currently in its final stages and the outcome is expected to be announced by VicForests in late 2012.

### 3.2.1.4 Properties of key commercial species

The properties of some of Victoria's key native forest species are summarised in Table 3-1. The suitability of Victorian species for new products is discussed under the relevant product analysis in Section 4.

**Table 3-1 Properties of key Victorian hardwood species**

<table>
<thead>
<tr>
<th>Species</th>
<th>Appearance</th>
<th>Strength rating</th>
<th>Durability rating (above ground)</th>
<th>Applications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mountain ash</td>
<td>Pale brown with open texture</td>
<td>Seasoned: SD3</td>
<td>3</td>
<td>Structural, furniture, flooring, joinery</td>
</tr>
<tr>
<td>Alpine ash</td>
<td>Pale pink or pale yellow-brown with moderately course grain</td>
<td>Seasoned: SD4</td>
<td>3</td>
<td>Structural, furniture, flooring, joinery</td>
</tr>
<tr>
<td>Messmate</td>
<td>Light brown to brown with open texture and straight grain</td>
<td>Seasoned: SD3</td>
<td>3</td>
<td>Structural, furniture, flooring</td>
</tr>
<tr>
<td>Silvertop ash</td>
<td>Pale brown, sometimes pinkish with medium texture and interlocked grain</td>
<td>Seasoned: SD3</td>
<td>2</td>
<td>Structural</td>
</tr>
<tr>
<td>Cut-tail</td>
<td>Pale brown with medium texture</td>
<td>Seasoned: SD5</td>
<td>4</td>
<td>Structural, furniture, flooring, joinery</td>
</tr>
<tr>
<td>Mountain grey gum</td>
<td>Pale yellow to brown with medium texture and straight grain</td>
<td>Seasoned: SD2</td>
<td>2</td>
<td>Structural, sleepers, flooring</td>
</tr>
<tr>
<td>Yellow stringybark</td>
<td>Yellowish brown with pink tinge, medium texture and interlocked grain</td>
<td>Seasoned: SD3</td>
<td>2</td>
<td>Flooring, poles, sleepers</td>
</tr>
</tbody>
</table>

Source: CSIRO (2009) and www.timber.net.au

Notes:

1. There are seven strength groups for unseasoned timber, ranging downwards from S1 (strongest) to S7 (weakest), and eight strength groups for seasoned timber, ranging downwards from SD1 to SD8 (AS/NZS 2878 (2000) Timber-Classification into strength groups. Standards Australia).  
2. The natural durability rating of a timber species is a rating of the timber's resistance to attack by wood destroying fungi and wood destroying insects. The lower the number the higher the performance in terms of durability.
3 Victorian Forest Resource Profile

3.2.2 Other public native forest harvest

DPI is responsible for the management of up to 140,000 m³ per annum of public forest harvest red gum sawlogs from the Murray River region in north west Victoria. Key areas of commercial sawlog harvest include the Bendigo Forest Management Area (FMA) box-ironbark sawlog harvest and the Mid-Murray FMA river red gum harvest. A small volume of speciality timbers are also harvested from the Otway FMA. Table 3-2 outlines maximum harvest volumes by product type obtained from Wood Utilisation Plans for each Victorian FMA or District. The resource is generally either processed in-field or in small milling or processing operations locally.

<table>
<thead>
<tr>
<th>Region</th>
<th>Sawlog</th>
<th>Speciality timbers</th>
<th>Minor produce</th>
<th>Residual log, bush-sawn wood or chip logs</th>
<th>Commercial posts licences</th>
<th>Commercial firewood licences</th>
<th>Domestic firewood collectors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benalla-Mansfield FMA</td>
<td>7450</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bendigo FMA</td>
<td>550</td>
<td></td>
<td>1,600</td>
<td>9,600</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Central FMA</td>
<td></td>
<td></td>
<td>1,800</td>
<td>8,800</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Central Gippsland FMA</td>
<td>480</td>
<td>1000</td>
<td>5,000</td>
<td>13,279</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dandenong FMA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>East Gippsland FMA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5,463 shared</td>
</tr>
<tr>
<td>Horsham FMA</td>
<td>600</td>
<td>200</td>
<td>300</td>
<td></td>
<td></td>
<td></td>
<td>3,205</td>
</tr>
<tr>
<td>Midlands District</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Murray Goldfields District</td>
<td>200</td>
<td></td>
<td>400</td>
<td>1,500</td>
<td>450</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mid-Murray FMA</td>
<td>1,050</td>
<td></td>
<td>6,400*</td>
<td></td>
<td></td>
<td></td>
<td>4,000</td>
</tr>
<tr>
<td>North East FMA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>37,600</td>
</tr>
<tr>
<td>Otway FMA</td>
<td>30</td>
<td>250</td>
<td>3,000*</td>
<td>3,880</td>
<td>2,240</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Portland FMA</td>
<td>650</td>
<td></td>
<td></td>
<td></td>
<td>2,290</td>
<td>2,395</td>
<td></td>
</tr>
<tr>
<td>Tambo FMA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>10,000</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>2,880</td>
<td>30</td>
<td>850</td>
<td>7,850</td>
<td>19,400</td>
<td>113,322</td>
<td></td>
</tr>
</tbody>
</table>

*Includes 6,000 green metric tonnes and 400 cubic metres, summed using 1:1 ratio
*Bundles of tea tree stakes, including 1000 bundles for domestic use
Source: Department of Sustainability and Environment Wood Utilisation Plans for Victorian Forest Management Areas and Districts (2011/12-2013/14)
3 Victorian Forest Resource Profile

3.3 Victoria’s private native forests

The Victorian Department of Sustainability and Environment (DSE) estimates that there are 1.025 million hectares of private native forests in Victoria, but that only 350,000\(^5\) ha are legally available for harvest (DSE, 2008). The timber productive capacity of this area is largely unknown.

Timber production from private native forests in Victoria is currently very small relative to the size of the forest base. A 2006 summary of private native forests harvest by the Northern Inland Forestry Investment Group (NIFIG) estimated an annual private native forest harvest in Victoria of 77,000 m\(^3\) (NIFIG, 2006). There is limited information on the species or log grades produced from private native forests, but a proportion of this estimate would be pulpwood. In many instances private native forest management is not commercially driven and is mainly used to generate timber for on farm uses such as posts and firewood.

All native forest harvesting must comply with the Code of Practice for Timber Production 2007. Variations to the Code are currently being considered to improve the certainty of timber supply from native forests, while balancing the needs of the environment. The variation concerns the wording in relation to the application of the Flora and Fauna Guarantee Act 1988 at timber harvesting coupes and aims to allow more flexibility for forest managers.

Planning permits from local government are also required if forest products are to be sold. Private native forest landowners need to consider potential impacts on water quality, aquatic habitat, biodiversity, Aboriginal heritage places and visual amenity when managing native forest for timber production. Timber Harvesting Plans submitted to local government must include:

- The estimated timber volumes to be harvested;
- The proposed haulage route;
- A map showing:
  - the coupe location(s)
  - the area(s) to be harvested
  - exclusion zones within the coupe boundary, including areas reserved or specifically managed for biodiversity conservation, waterway protection (including any buffers or filter strips), or protection of Aboriginal cultural heritage
  - power lines
  - new or upgraded roads and coupe infrastructure within the property
- Conditions applying to the operation;
- Relevant fire protection measures;
- The period during which the operation is to occur; and
- A post-harvest regeneration program where relevant.

Support for landowners wishing to manage their private native forests for timber production is available through the DPI.

There may be potential to produce larger volumes of wood products from private native forests in Victoria, and this may help to offset some of the reductions in availability from public forests. However further developments are required to better understand the productive potential of the private native forests.

---

\(^5\) This area was calculated by subtracting the exclusion zones listed in the Code of Practice for Timber Production 2007 (DSE, 2007) and forest management zones that do not permit timber harvesting, from the total area of forest. Timber harvesting activities are not permitted in nature conservation reserves; therefore, no land in this tenure is available for timber production.
Investment and Innovation Pathways in the Victorian Hardwood Processing Industry

3 Victorian Forest Resource Profile

Victoria's forest resource and to assist landowners in managing and marketing their resources, and meeting regulatory requirements.

3.4 NSW public native forests

There is a large public native forest estate in NSW which is managed by Forests NSW for commercial timber production. Most of the native forest resource is located in the northern regions of NSW, however there is some resource in southern NSW that may be available to compliment Victorian timber resources.

Forests NSW harvests around 40-50,000 m$^3$/annum of sawlogs from the Tumbarumba region. This resource is approximately 50% ash and 50% mixed hardwood species such as mountain gum (E. dalrympleana) and manna gum (E. viminalis). At present a large proportion of this resource is unallocated and could potentially be available for purchase by Victorian customers (pers. comm. Forests NSW 26/9/12).

Forests NSW also produces around 50,000 m$^3$/annum of mixed species sawlog and around 300-400,000 m$^3$/annum of pulplogs from the southern coastal region from around Eden to Batemans Bay. The sawlog resource is currently committed to sawmills and the pulplg resource is exported through the Port of Eden (pers. comm. Forests NSW 26/9/12).

3.5 Hardwood plantations

There are around 206,000 ha of hardwood plantations in Victoria, comprising predominantly Tasmanian blue gum (E. globulus) with some smaller areas of shining gum (E. nitens), sugar gum (E. cladocalyx) and mountain ash (E. regnans) (ABARES, 2012c).

The majority of hardwood plantations were established over the last 15 years through managed forest investments and are managed over short rotations (8-12 years) for the production of woodchip. From around 2015, this resource is expected to provide around 3-4 million m$^3$ per annum of predominantly pulpwod (Figure 3-8). Around three quarters of this resource or approximately 2-3 million m$^3$ pa is located in the Green Triangle region of south west Victoria and south east South Australia. Central Victoria the next largest hardwood pulpwod plantation region, expected to produce around 400-600,000 m$^3$ pa. Central Gippsland is also expected to produce around 300-500,000 m$^3$ pa from 2015. A map of the plantation regions referred to is provided in Figure 3-9.

Victoria’s hardwood plantation estate potentially provides a significant domestic supply opportunity for the production of a range of forest products, including pulp and paper manufacture, engineered wood products and bioenergy and biofuel. Currently there are limited domestic markets for this pulpwod resource and, as a result, the plantation managers are concentrating on supplying export woodchip markets in Japan and China. However if a proposal for hardwood pulpwod based processing were to be developed in close proximity to the plantation resource, it would potentially provide a strong opportunity for utilising this resource. If viable markets for hardwood plantation resources are not secured it is possible that plantations would not be re-established for a second rotation after harvesting and the size of Victoria’s hardwood plantation estate would decrease.

Only a very small proportion of Victoria’s hardwood plantations are currently managed over longer rotations for the production of sawlogs. HVP Plantations produces around 5,000-10,000 m$^3$ pa of sawlog products from its hardwood plantations in the Strzelecki Ranges in Gippsland. The quality of plantation hardwood sawlogs is considered by the processing industry to be much lower than native
forest logs. Plantation resources managed over longer rotation for the production of sawlogs could only be seen as a supplemental resource to a sawmilling operation based on native forest resource. They could also potentially be used as peeler logs in the production of veneer and plywood products although the scale limitations of this sawlog resource would mean that it could only supplement a larger supply from another location.

Figure 3-8  Forecast Victorian hardwood plantation log supply
(average annual supply for each five year period)

Source: ABARES (2012d) Note: Murray Valley and East Gippsland-Bombala regions overlap into NSW
3 Victorian Forest Resource Profile

Figure 3-9 Plantation regions

Source: ABARES (2012c)

3.6 Softwood plantations

A significant softwood plantation resource exists in central and western Victoria, Gippsland and along the northern sections of the Hume Highway extending into NSW. Softwood plantation resources in Victoria and south east NSW could also potentially provide supplementary resources to Victorian processing facilities.

In total, there around 226,000 ha of softwood plantations in Victoria (ABARES, 2012c). Radiata pine (Pinus radiata) is the dominant softwood species, accounting for 99% of the total softwood plantation estate. These plantations are typically managed on a 28-35 year rotation under a multiple thinning regime with the objective of maximising sawlog production. Figure 3-10 shows future forecast supply volumes of sawlogs and pulplogs.

Due to the geographic concentration and uniformity of softwood plantations, they have traditionally been processed by specialized and relatively large scale processing facilities. Despite this there is still scope for hardwood processors to review options to include softwood feedstocks into their production processes. While this is unlikely to be economic for milling solid timber products, there may be opportunities to use a combination of hardwood and softwood in plywood and laminated veneer lumber production, composite wood products (e.g. MDF), pulp and paper production and bioenergy.

Most of Victoria’s softwood plantations are owned by HVP Plantations. HVP Plantations sells softwood resources through a combination of long and short term contract arrangements. As existing log sale contracts expire the opportunity exists for new customers to enter the market to purchase softwood logs. New customers would need to compete with the existing industry on price in order to secure resources.
3 Victorian Forest Resource Profile

Figure 3-10 Forecast Victorian softwood plantation log supply

Sawlog supply

Pulplog supply

Note: Murray Valley and East Gippsland-Bombala regions overlap into NSW
Source: ABARES (2012d)
**Hardwood Markets and Product Trends**

This section provides an overview of existing and emerging forest product markets relevant to the Victorian hardwood processing industry and potentially to new investors outside the industry. Section 4.1 introduces some high level trends in domestic and international wood product markets and in the global economy that are influencing the demand for forest products. Section 4.2 reviews a range of existing markets commonly supplied by the Victorian processing industry. The section assesses available market opportunities and risks based on current market trends. Section 4.3 reviews new or emerging markets for hardwood forest products, discussing the future prospects of these markets and relevant factors influencing their feasibility in Victoria. A summary of key points from the section are outlined in the summary box below.

**Summary of key market opportunities for the Victorian hardwood industry**

**Key opportunities**

- Flooring – strong underlying demand for appearance grade hardwood products. Particular attention should be given to opportunities to re-allocate production volume into this market where possible and exploring lower cost, high growth products including engineered flooring products.

- Decking – opportunity for using durable species in decking applications where pricing permits or for producing treated decking from less durable species, particularly across lower grades as a more attractive competitor to treated pine decking.

- Structural and appearance – Pre-fabrication and design solutions for the building industry is an increasingly important market segment that is undercapitalised by the Victorian industry. New approaches including pre-fabricated framing, flooring and fencing systems should be explored.

- Furniture – differentiating products in the market and capturing value in the domestic market from the environmental and social benefits of Victorian hardwoods will be important. Responding to the specific needs of customers by providing custom product solutions will provide additional value to producers.

- Joinery and mouldings – in line with the furniture market the industry will position itself in the best market segment by working closely with customers producing custom pre-fabricated solutions that respond directly to customer needs. Production options include: windows, doors and stairs.

- Product branding – with current trends in the building industry towards eco-friendly design it is critical that the industry demonstrate the relative environmental benefits of choosing wood products instead of non-wood products and boosting consumer preference towards wood.

- Bioenergy – presents an important opportunity for boosting the value of hardwood forest production. However, limited Australian Government support for native forest fed bioenergy means that the best opportunity in the short term is from plantation feedstocks. Wood pellet export may present an alternative market to the woodchip export market that the native hardwood industry can supply in anticipation of future changes to energy policy.

- Cross Laminated Timber, Engineered Strand Lumber and plywood and veneer should be explored further to determine potential product specification, production suitability and depth of domestic demand.
4 Hardwood Markets and Product Trends

4.1 Macro trends in the wood products industry

Sawn timber production has been the product mainstay of the Victorian hardwood industry since its early development. Timber has been used for a large number of important applications from building, packaging, furniture and joinery, and a range of other end uses. The construction industries and in particular the residential construction industry has been a critical driver of the industry over time.

Before Australia’s softwood plantation estate was established and mature, hardwood timber formed the backbone of Australia’s timber requirements. The strong demand for hardwood timber in the past meant that Victorian sawmills could produce a standard array of timber products which could be readily applied to a range of applications.

Increasing supply alternatives to hardwood products

Long term sawn timber consumption in Australia has fluctuated between 4-5 million m$^3$ p.a. in line with housing construction. Figure 4-1 shows recent trends in the apparent consumption of timber in Australia. The figure also shows a steady increase in softwood sawn timber consumption, combined with a decrease in hardwood sawn timber consumption resulting from both declining resource availability and increasing competition from softwood producers. Apparent consumption of hardwood sawn timber in Australia has declined by an average of 2.8% pa since 1984/85 (Figure 4-2).

Hardwood products used in structural and high strength applications are also facing increasing competition from engineered wood products, such as laminated veneer lumber (LVL) and consequently it is expected that hardwood products will continue to focus on higher value, appearance and durability based markets such as flooring, decking and furniture.

Figure 4-1 Apparent consumption of timber and housing commencements in Australia

Source: ABARES (2012b); ABS (2012a)
NB: Consumption data unavailable after 2008/09

Figure 4-2 Apparent consumption of hardwood timber in Australia

Source: ABARES (2012b)
NB: Consumption data unavailable after 2008/09
Increasing global demand for wood products

Global production of industrial roundwood has increased steadily over a long period, averaging an annual increase of 1.1% pa since the 1960s. North America and Europe account for around two-thirds of global production whereas the Oceania region (which includes Australia) accounts for less than 3% by volume (see Figure 4-3). Global production fell in the early 1990s following the breakup of the Soviet Union, and then grew again, before declining in the period post-2007 where the effects of the Global Financial Crisis (GFC) reduced roundwood consumption substantially.

Since the 1970’s hardwood production has remained around 30% of global total roundwood production. The majority of hardwood log production occurs in Asia, in countries such as Indonesia, Malaysia, Papua New Guinea (PNG) and Myanmar. However, the United States, Russia and a number of South American nations also produce substantial volumes of hardwood roundwood. Tropical hardwood logs comprise a significant share of the traded volume of hardwood logs. These logs are typically sourced from native rainforests in Asia and South America as well as parts of central-west Africa. Figure 4-4 shows how exports of tropical logs have declined as a result of increasing pressure to protect tropical forests from deforestation and over harvesting.

The Asian market is of particular relevance to Australia because it has traditionally been a key source of Australian tropical timber imports and is also a potential market for Australian hardwood products. Asian imports of sawn timber have been increasing in recent years in line with the economic growth of the region and the declining availability of some of the region’s traditional forest resource. Figure 4-5 shows the growth in Asian hardwood sawn timber imports and recovery since the GFC, and particularly the increasing imports into China.
The Victorian hardwood processing industry is a very minor supplier at a global level. Figure 4-6 shows that only 1% of the hardwood sawn timber produced globally is produced in Oceania\(^6\), and of this 1%, around 21% is produced in Victoria.

\(^6\) Oceania consists of Australia, New Zealand and the Pacific Islands.
4 Hardwood Markets and Product Trends

The growth of demand in China and other Asian countries

Over the past 10 years, China has had an increasingly significant influence in international forest product markets. The growth in Chinese consumption of raw wood products has increased with growth in the wider economy created by economic reforms throughout the 1980s and 1990s.

China has become the largest importer of softwood and hardwood logs internationally. For softwood logs, Chinese imports have increased from 640,000 m$^3$ in 1996 to 23 million m$^3$ in 2007 predominantly through expanded imports from Russia. China now accounts for 70% of softwood log imports in the Pacific Rim (RISI, 2007).

Figure 4-7 shows the trend in hardwood log imports since 1995. Hardwood log imports have also increased by a large margin with growth from around 2 million m$^3$ in 1995 to almost 14 million m$^3$ in 2007. Import volumes decreased dramatically in the years immediately following 2007 as a result of the GFC, and recovery has occurred since then, with PNG and the Solomon Islands being major sources of hardwood log imports to China. Imports of logs from Russia and Malaysia have fallen significantly since 2007, with Russian log trade declining as a result of increased log export excises being applied by the Russian Government and log export bans in Malaysia and neighbouring Indonesia.

Imports of sawn timber into China are also showing a long term increasing trend, with Thailand, the US and Indonesia being the most prominent sources of timber imports (Figure 4-8).

China’s increasing demand for forest products is to support its growing production of secondary wood products both for domestic and international markets. One example of this is the significant growth in exports of furniture manufactured in China. This is discussed further in Section 4.2.2. With ready access to low cost labour, often less stringent regulatory burdens, and major industrial supply networks, China has built itself as the world’s largest manufacturing base over the past two decades. As a result much of the world’s value adding, including in the wood products industry, has either been lost to China or retained by companies but produced in China under offshoring arrangements. However this trend is not irreversible and a range of factors could potentially have an important counteracting influence. For example, increasing automation in manufacturing processes in the western world is allowing manufacturers in these countries to some previously lost production primarily through a significant reduction in labour costs (The Economist, 2012).
The Indian economy has been growing rapidly since the 1980s. India has a well-established forest industry. However, as Figure 4-9 shows, the country is becoming increasingly dependent on forest product imports due to limitations with domestic log supply. In 2010, India’s imports of wood, pulp and paper products were valued at around US$5 billion. The majority of solid wood imports are in the form of roundwood due to India’s high import tariffs on value-added timber products. The continued growth of the Indian economy in the longer term and associated demand for wood products is expected to create opportunities for Australian exporters in the future.
4 Hardwood Markets and Product Trends

**The impacts of the Global Financial Crisis**

The GFC which had the largest impact on the world's financial systems over 2008-09, took a significant toll on international forest product markets. Demand for forest products, particularly timber, fell in the US where the GFC had its most direct impact as a result of a significant period of housing growth followed by wide ranging home loan defaults and stranding of housing assets. Demand for wood products also fell in the European Union (EU) where many western European banks were significantly exposed to derivatives backed by US home loans. Those countries that were most exposed to the US housing crisis and/or had the highest levels of corporate and government debt suffered the greatest impacts over time as credit availability tightened and finance costs increased. In 2009 the only EU country to remain out of recession was Poland. The result in the four years since the GFC in both the US and much of the EU is that consumption remains low and unemployment high relative to recent historic levels before the GFC, particularly the southern EU countries and Ireland.

The ongoing impact of the crisis has meant that housing starts are around 700,000 units in the US, up from around 550,000 units in 2009 but down from a peak of close to 2.1 million units in 2005. As a result timber and panel demand remains low and prices are flat, down by around $100-150 per unit (UNECE, 2012). Weak levels of demand in the US have resulted in many mill closures and a sharp rise in imports over the period since 2009, with Australia receiving some of this excess supply, largely as softwood lumber and engineered wood products.

Housing starts in the EU are also low with 1.1 million units commenced in 2011-12 compared to a peak of 2.38 million units commenced in 2005-06. Similarly to the US, weak regional demand for European timber has increased the volume of timber exported to international destinations including Australia which has received larger than normal volumes of structural softwood timber from the EU over the past 2-3 years.

**Verification of timber legality**

Broader changes in forestry and environmental policy are expected to have an impact on the availability and cost of wood production in the future. Forest certification and legality is a significant policy issue currently having an effect on resource availability and wood product markets.

In late 2011, the Australian Government introduced the draft legislation to prohibit the importation and sale of illegally sourced timber products. The Bill intends to place restrictions on the trade of illegal timber products by requiring importers of regulated timber products and domestic processors of logs to undertake due diligence on the provenance of their resource. The development of regulations will prescribe these due diligence requirements.

The Australian Government has stated that it will establish a monitoring system and develop capacity to undertake investigations to enforce the requirements when it becomes law. The draft legislation is currently undergoing consultation with industry and other stakeholders and the legislation is expected to be operational around two years after the proposed legislation passes through Parliament.

This legislation is expected to place limitations on future import volumes of hardwood timber from countries notably Indonesia, Malaysia and PNG, and in wooden products such as furniture from countries such as China. The extent to which this occurs will be dependent on the stringency and usability of due diligence regulations that are developed by government over the next few years.

The onus for verifying the legality of imported timber is expected to fall on Australian timber importers, who will be required to show chain of custody evidence demonstrating the legality of the product back
Certification of sustainable forest management

Concern over the sustainability of forest management practices around the world has led to growing interest by consumers in independent certification that forest products were sourced from legal and sustainably managed forest areas. This has seen the development of forest certification schemes to demonstrate legality and sustainability. In addition, some governments have introduced approaches to ensure the legality of wood product imports.

There are a number of internationally recognised certification schemes for sustainable forest management. The two main certification systems operating in Australia are the Australian Forestry Standard (AFS) and the Forest Stewardship Council (FSC).

Globally, around 190 million ha of forests are certified under the Program for Endorsement of Forest Certification Schemes (PEFC) and around 106 million ha under the Forest Stewardship Council (FSC) certification system. In Australia, around 7.8 million ha of forests are certified under AFS and 0.5 million ha under FSC.

The Australian Forestry Standard (AFS) was developed between 1999 and 2003 and is recognised under PEFC. PEFC is an independent global umbrella organisation for the assessment and mutual recognition of national forest certification schemes. It has 35 independent national forest certification systems in its membership, of which 25 have been endorsed by the PEFC Council. AFS is a recognised standard by Standards Australia.

The Forest Stewardship Council (FSC) provides an alternative form of certification for plantation forest growers. FSC is administered by a board that offers an adapted international forest management standard that is applied to forests in Australia. Like AFS, certification is issued by independent third party forest management auditors. To date, in Australia, FSC has been primarily been achieved in plantation forestry. The need to gain full stakeholder support limits opportunities for FSC certification in the Victorian native forest sector.

In Victoria, VicForests operations are certified under the AFS. In Victoria, only relatively small sections of private native forestry have been certified under FSC.

Increasing demands for certification are expected to provide market opportunities for Australian forest products, both in terms of competition with imports as well as in export markets. In particular, increasing efforts to ensure more sustainable harvesting of tropical forests is expected to reduce supplies of hardwood to international markets which will create demand for Australian hardwood timber exports and also reduce competition from imported hardwood in domestic markets.

4.2 Review of existing hardwood markets

Australia has historically been a major producer of hardwood products. In general terms, much of the production capacity is associated with the hardwood sawmilling sector, which produces sawn timber
4 Hardwood Markets and Product Trends

that can be further processed into a range of secondary wood products (e.g. joinery, mouldings, furniture), or used directly in a range of end uses, most notably for residential construction purposes.

The sections below provide a summary of the main timber markets into which Victoria’s hardwood resource is commonly sold. The markets considered are:

- Sawn timber for building construction;
  - Structural timber;
  - Flooring and decking;
- Furniture;
- Joinery and mouldings;
- Niche timber markets;
- Pulp and paper; and
- Woodchip export.
4 Hardwood Markets and Product Trends

4.2.1 Sawn timber for building construction

**Summary of sawn timber market opportunities and risks**

**Key opportunities**
- The appearance characteristics of Victorian hardwoods are highly valued, with strong market acceptance. This should be built upon by enterprises by, where possible, structural grade wood being re-allocated into higher value appearance products.
- Exploring the growing market awareness of locally sourced and sustainable production is an opportunity for the Victorian industry, capitalising on eco-building where locally sourced, sustainably grown and durable hardwood products can be used in the construction process;
- For flooring and decking timber, processors should explore options to maintain competitiveness, through using lower cost materials and production processes to enable a more compelling product offering (e.g. engineered flooring).
- Standardising flooring timber dimensions to improve product application, reliability and awareness;
- Development of flooring systems or other building structure systems have the potential to assist the Victorian industry, whereby multiple building components are addressed through a single product that is produced in cooperation with design plans.
- Further constraints in hardwood resource volumes will mean quality Victorian hardwoods will be increasingly scarce and potentially higher value in the market.
- There is the potential that imported supplies of outdoor decking may decline in the future due to resource limitations and trade policy impacts on illegal timber trade. This may provide an opportunity to the Victorian industry in this segment.
- Processors should consider broader opportunities in the decking and privacy screen markets as these segments are currently growing. There are likely to be supply opportunities for durable mixed species but also potentially for treated or untreated ash depending on the application.
- Other ‘product improvement’ innovations could be considered by processors such as powder coating and other treatment options that would allow non-durable Victorian hardwoods to compete strongly in outdoor product markets (e.g. weatherboards) where low maintenance and fashionable appearances are important distinctions.

**Key risks**
- Further decline in the demand for structural hardwood timber in building construction could occur, thereby creating difficult market conditions for producers.
- Increasing preference for higher density living will reduce the proportion of detached houses that are built in the overall residential market – a traditional source of demand for hardwood structural timber.
- Emphasis on lightweight building systems and ‘fit for purpose’ designed products will need to be considered by hardwood producers.

A large proportion of sawn timber production is produced to supply the residential construction industry. Timber products consist of kiln dried structural and flooring grades and ‘green’ (undried) structural, non-structural construction timbers and utility products.
4 Hardwood Markets and Product Trends

As discussed in Section 4.1, a transition has taken place in the hardwood timber industry over the past 20 years, where competition from softwood and other products has progressively captured market share in the structural timber market.

The movement of hardwood timber production away from structural grades to higher value appearance grades has seen the residential alterations and additions market become a more important driver of domestic demand for hardwood sawn timber, while the relative importance of housing commencements has declined. Figure 4-10 shows consistent growth in the value of alterations and additions in Australia. Spending on alterations and additions has historically been much more stable than spending on the construction of new houses.

In overall volume terms, hardwood imports play a relatively small role in the markets for hardwood products. Imports currently account for around 9% of Australia’s hardwood sawn timber consumption – a substantial portion of this imported volume is tropical hardwood timber for decking. Malaysia and Indonesia are the largest sources of hardwood sawn timber imports into Australia. Figure 4-11 shows Australian imports of hardwood timber. The increasing constraints on native forest resources in these countries will limit the ability of imports to capture a greater share of the Australian market. In addition, increasing efforts to ensure the legality and sustainability of imported tropical timber may constrain imports.

However, opportunities to replace imports will be affected by domestic resource constraints. Supply from Australia’s public native forests is likely to continue to decrease over the next 10-15 years due to existing State Government policy positions and impacts of forest growth such as wildfire. Supply from private native forests or hardwood plantations present an alternative opportunity to boost the annual hardwood sawlog harvest in Australia. The potential contribution of private native forests varies widely and is not well researched (see Section 3.3). Hardwood plantations in Victoria have been established predominantly for the production of pulplogs rather than sawn timber (see Section 3.5) and this presents other limitations for using this as a supplementary resource although given a compelling business case growers may be interested in adjusting their management regimes.

As a result of declining supplies of public resource native forest logs, there may be increased value in the market for Victorian species that are less readily available – particularly durable species that are harvested in smaller quantities.
4 Hardwood Markets and Product Trends

Figure 4-10 Value of Australian alterations and additions

Figure 4-11 Quarterly Australian imports of hardwood sawn timber

Source: ABS (2012a)  
Source: Global Trade Atlas (2012)

In addition to changes in market drivers, there are also changes taking place in building trends and the applications of materials in the construction of houses and commercial buildings. The box below outlines some of the key changes that have taken place in recent years.
4 Hardwood Markets and Product Trends

**Changing trends in the Australian building industry**

Changes in building trends have also occurred where home building increasingly turns to modular design where the design and construction phase takes place off-site and a smaller scale ‘installation’ phase occurs at the building site. One major example has been the boom in the building industry using pre-fabricated framing and roof trusses. Pre-fabrication along these lines allows for:

- Delivery to the building site of partially completed sections of a house which can then be quickly nailed into place;
- A lower cost and faster construction phase where less on-ground labour and machinery is required;
- More precise on-site measurement and quality control of construction through replication of production processes; and
- Lightweight building materials that are durable but can be moved into place with minimal fuss.

Along with off-site frame and truss construction, cross laminated timber is another form of modular design that is becoming increasingly popular internationally. This product is discussed further in Section 4.3.2.

Increasing concern from building designers for health and well-being is also influencing design, and designers are now looking to minimise use of products that have a large environmental footprint including products that have a large carbon footprint, or produce highly toxic residues during their product lifecycle.

While timber fits nicely into this trend, the concept of eco-friendliness is often based mostly on perception and without strong demonstration of the credentials of timber, there is a risk that its place as an environmentally friendly material will be misconstrued.

**Structural timber**

Despite the decline in the market for hardwood structural timber, structural timber still represents a significant portion of the product outturn from Victorian hardwood sawmills. The major product in the structural timber market is F17 – a high strength timber grade used primarily for higher strength structural applications in house construction (e.g. lintels, beams, girder trusses). Victorian sawmills have faced increasing competition in the structural market from softwood LVL products over the last decade. Imports and consumption of LVL have increased dramatically (see Figure 4-12), which has led to further displacement of F17 in the market. Imports from the US and New Zealand have supplied a large section of this market, particularly since the GFC, where excess supply has led to cheaper imports into Australia. Figure 4-13 shows how LVL prices have declined in Australia in relative terms, while F17 prices have continued to rise.
Many Victorian sawmills have reported that the increase in LVL imports is having a negative effect on their businesses through increased competition on price. Apart from price, LVL has several characteristics that make it a valuable product from a consumer’s point of view including its consistent strength, lower weight and its availability in long lengths. In response, the Victorian hardwood industry has produced a finger-jointed Supa17 product that has addressed some of the key customer demands and helped maintained F17 market share. Sawmills that process C-grade sawlogs and which don’t have finger-jointed manufacturing facilities are likely to continue facing pressure in the market. The increasing occurrence of gum vein in ash sawlogs will reduce the percentage of appearance grade wood that can be sawn. As a result sawmills will most likely find themselves producing larger volumes of structural grade (e.g. F17) timber. Selling additional volumes of this product in the present market conditions will be challenging for Victorian producers.

As a result, there is a strong incentive for the hardwood processing industry to consider alternative product opportunities for F17 grade timber, to seek out higher value opportunities and reduce volume into the F17 timber market. The trend toward pre-fabrication (e.g. frame, truss, structured and finished flooring systems and pre-fabricated fence designs) and design partnerships in delivering custom building solutions for residential projects should be explored by the hardwood industry in more detail.

The nature of F17’s role in serving the building industry may mean that there are also opportunities to better present the product to market. F17, Supa17 and finger-jointed F17 are used in flooring and roofing applications where high strength products are needed. With the trend towards pre-fabrication in residential construction, there may be opportunities for timber producers to develop services oriented towards the design aspects of construction solutions for the housing market, and utilises the strengths of hardwood products (including strength, durability and appearance characteristics). This could include working more closely with pre-fabrication companies or design firms in developing customised building solutions for end product applications, particularly where this recognises the depth of knowledge that the sawmilling industry possesses of timber characteristics. For example this could be in the use of F17 product that has a structural and visual aspect in the product’s application, that therefore capitalises on strength and appearance attributes of the Victorian product.
4 Hardwood Markets and Product Trends

Flooring and decking timber

Flooring markets have been very important in the shift to appearance markets for hardwood sawn timber. As discussed above, robust spending in residential alterations and additions have ensured that there has been steady demand for appearance products such as flooring and joinery timber and for landscaping and decking products. During downturns in Australian housing commencements, residential alterations and additions has shown to be a more reliable prospect than the house construction market. On top of this generally more stable demand base, consumer taste for natural timber products has remained strong over time, with robust underlying demand for the ‘look and feel’ of quality Australian hardwood products.

Flooring and decking products are relatively high value timber grades and to this end, the higher the proportion of flooring and decking that a producer can produce, the better for overall sawmill returns. Similarly producers should consider whether there are opportunities to produce a higher proportion of this higher grade product by recovering more wood of this grade from the existing production process. Wood Products Victoria (WPV) has identified this as an area of strong potential for the industry to capture increased value from the current production volume of F17 in particular (WPV, in press).

Through the workshop undertaken as part of this project, participants identified the lack of standardised dimensions for flooring as a factor that is inhibiting the use of Victoria’s hardwood flooring products. Standardised dimensions will help to improve the product’s application reliability and awareness amongst the building industry and create a clearer message on Victorian hardwoods.

Victorian ash flooring is a lower value product compared to other Australian flooring timbers. Figure 4-14 shows changes in timber flooring prices available from the Timber Market Survey (URS, 2012). Since mid-2007 the price of NSW blackbutt and spotted gum flooring has increased at a faster rate than Victorian ash and Tasmanian oak flooring. This may reflect a combination of factors including increasing resource constraints, log costs and consumer preferences for different hardwood species and particularly the darker coloured species. These trends however provide opportunities for both ash and the Victorian mixed species. For example, with colour a trend, the nature of Victorian ash allows it to be coloured to darker shades that meet emerging consumer preferences. Similarly some mixed species provide differing colour and features that can respond to consumer preferences.

Some Victorian sawmills have developed small scale export markets for flooring timbers. Most exports are destined for the Asian market. The exporters have been able to successfully market the unique features of Victorian timbers, particularly mixed species. This differentiation is important as Victorian exporters will struggle to compete on price in international markets.
4 Hardwood Markets and Product Trends

The market for engineered flooring products has increased in size over the past 10 years. Engineered floors are a 3-4mm hardwood veneer typically glued to a plywood tongue and groove base. The development of the engineered flooring market has come about to provide a lower cost, consistent quality product, that can be installed as an overlay to an existing floor or straight to a concrete slab, but retains the look and feel of natural timber flooring. The ease of application has particular relevance in today’s housing market where concrete multi-story apartments and the increased prevalence of houses built on concrete slabs, makes using solid timber less necessary. The engineered flooring market presents a strong opportunity for Victorian producers to produce a flooring product that competes in the flooring market, particularly in the market for apartments and townhouses. It may also present an opportunity for mills to become more vertically integrated and deal directly with end-customers to address specific flooring needs. The potential of this market will be significantly improved where a strong public awareness/branding strategy is put in place.

Historically, the Victorian hardwood industry hasn’t been a major producer of decking products. This is the result of the relatively low proportion of high durability species produced. However, currently decking and privacy screens are popular product applications (WPV, in press). Producers should consider opportunities to further explore these markets where they clearly present better opportunities than the flooring market. Higher feature appearance timber and potentially some component of F17 grade may present good opportunities for supplying this market. Species like ash and messmate that do not meet the durability requirements for these applications could be treated and supplied as a branded Victorian product. Treated or untreated non-durable products may be appropriate for ‘covered decking or screening’ applications where there is less exposure to wet weather and where durability is less of a concern. Currently this is not a defined segment of the market and there may be marketing and supply opportunities for some processors.
4 Hardwood Markets and Product Trends

Currently there is only isolated marketing taking place around the environmental credentials of Victorian hardwood appearance products. Brand positioning, whether undertaken by individual companies or as an industry collective, may help to build demand based on the product being local and sustainable. Marketing such as this is likely to be most effective for those products that are differentiated in the market, rather than more commodity type products such as F17 which to a larger extent compete on price. The opportunity for recognising the local character and the environmental credentials of Victorian hardwoods is likely to also be readily applicable to joinery and furniture products where customers demand products with a range of characteristics. Furthermore the declining volume of native hardwood availability over time may help to improve pricing of Victorian flooring and decking as the scarcity value of these species is recognised in the market.

4.2.2 Furniture

<table>
<thead>
<tr>
<th>Summary of furniture market opportunities and risks</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Key opportunities</strong></td>
</tr>
<tr>
<td>• The appearance characteristics of Victorian hardwoods are highly valued and demand is likely to be stable longer term.</td>
</tr>
<tr>
<td>• There is an opportunity for improving the recognition of Australian timber furniture amongst Australian consumers, particularly in those segments of the furniture market that are not driven predominantly by price.</td>
</tr>
<tr>
<td>• Niche furniture products based on local production, where designers and manufacturers work closely together to directly address specific customer needs.</td>
</tr>
<tr>
<td>• Outsourcing of higher cost parts of production process for higher volume operations may be helpful for reducing production costs but may be most beneficial as an outsourced part of the production process rather than simply an opportunity for export sales.</td>
</tr>
<tr>
<td><strong>Key risks</strong></td>
</tr>
<tr>
<td>• With the decline of much of the Victorian furniture production capacity it may be difficult for much of the industry to regain market share under a ‘business as usual’ approach.</td>
</tr>
<tr>
<td>• There is strong potential for branding Victorian hardwood furniture as locally grown and manufactured, however if environmental concerns are not handled carefully this may end up compromising potential value.</td>
</tr>
</tbody>
</table>

The world’s largest furniture manufacturers have traditionally been the US, Germany, Japan and Italy. However, over the last 10-15 years, China has emerged as the world’s largest producer and exporter of furniture. Chinese furniture exports increased from around 40 million units in 1996 to around 330 million units in 2011 (Figure 4-15). China’s export volume and cost-competitiveness, relative to other producers has had a large impact on the world furniture industry. In many cases, furniture manufacturers in western countries have been faced with either outsourcing their production to China or shrinking their businesses to become more niche, locally oriented markets.

Australia has faced similar pressures to many other higher cost manufacturing bases such as the US and parts of Europe. The total turnover of the Australian furniture industry was approximately $7.4 billion in 2006-07 (ABS, 2008); however, the volume of production has dropped significantly since this time with the increase in overseas imports of both indoor and outdoor furniture (Figure 4-16). Production of furniture timber from Victorian sawmills has reduced from around 33,000 m$^3$ per annum in 2004/05 to around 8,000 m$^3$ in 2010-11.
While there is likely to remain a strong market for locally produced high value hardwood furniture in Victoria and Australia, furniture at the low end of the value scale is likely to be subject to ongoing pressures from imports.

A potentially attractive product segment for Australian furniture producers may be in developing more specialised, niche products for the Australian consumer where the characteristics of the Victorian resource (e.g. appearance characteristics, and the fact that it would be locally sourced, sustainable and manufactured in Australia) are more strongly recognised. Further market research would be required to develop ideas in this segment of the furniture market.

In addition, ongoing expansion of the furniture industry combined with declining forest resources in Asian countries may provide an opportunity to supply sawn timber (typically short lengths) to offshore furniture producers. However, for this to be a strong market opportunity, supplies from other producers would need to decline substantially in order for Australian hardwood timber to be competitive on price.

Rather than on selling hardwood timber to international manufacturers where custody of the product is lost by Australian business, a potentially more prospective opportunity might be for timber producers to outsource the manufacturing process (or elements of the manufacturing process) under contract to an international company according to design specifications based on intensive market research. This applies to large volume as well as niche products and a range of market segments (e.g. indoor and outdoor furniture, playground equipment). By reducing manufacturing costs through offshoring but maintaining coordination of a highly specific marketing process that directly meets consumer needs, a higher value market position may be possible. In addition, retaining ownership through an international manufacturing process may also help to reduce regulatory hurdles when products are reimported into Australia as the products will have clear chain of custody and will not be mixed with illegally sourced products.
4 Hardwood Markets and Product Trends

4.2.3 Joinery and mouldings

**Summary of joinery and mouldings market opportunities and risks**

**Key opportunities**
- Potential to re-allocate a proportion of structural grade product into a higher value market either through a single processing operation, or through a manufacturing partnership between businesses.
- Development of more specialised customer-oriented joinery and mouldings designs that give producers a competitive advantage against growing, mass market international producers (e.g. Indonesia).
- Exploring new types of products for Victorian hardwoods including pre-fabricated, custom windows, doors and stairs.

**Key risks**
- The industry should ideally not compete head to head against international rivals based solely on price as profitability is likely to be low. Instead it should differentiate itself and engage in targeted marketing with customers based on customer service.

Joinery (including cabinetry, windows and doors) and mouldings (including skirting boards, cornices and architraves) potentially offer high value markets for hardwood sawn timber.

Competition in the joinery market from overseas producers has meant that production by Victorian sawmills has reduced from around 10,000 m$^3$ per annum in 2004/05 to around 4,000 m$^3$ in 2010-11 (WPV, 2012). In Victoria, there has been a shift in production away from furniture and cabinetry to windows and doors since 2004-05 as competition in these markets has increased.

The value of mouldings imports has increased dramatically over the past decade (Figure 4-17), particularly imports of hardwood mouldings from Indonesia which have increased by around 140% since 2006.
4 Hardwood Markets and Product Trends

Like furniture, simple joinery and mouldings products that can be mass produced internationally by competitors are unlikely to be highly profitable based on head to head competition on price. Ongoing production in the joinery and mouldings markets will require doing business more intelligently, where producers can either produce a more specialised product that international producers cannot easily replicate, or work closely with end customers to regularly understand their changing needs and product specifications so that they are in a position to quickly and accurately respond to demands. Opportunities to directly supply end customer orders may exist in the market for windows and doors where customers require high quality hardwood products built to specification. The manufacture of pre-fabricated stairs – currently already undertaken by parts of the industry – is a similar opportunity that provides a potentially valuable market for non-appearance F17 grade product.

4.2.4 Niche timber markets

A range of other lower volume markets may also suit the characteristics of particularly ‘mixed species’ timber products. There is currently limited information available on these markets and a scoping analysis has not been undertaken as a result. However, on a case by case basis, it may be worth individual enterprises considering the merits of these markets (and others) that display strong demand or pricing opportunities at a local or regional level. Examples include:

- Marine timbers – There may be case by case opportunities to supply the upgrade or renovation of wooden wharves, jetties and bridges in parts of Victoria, particularly in the case where regulations stipulate the use of the original Victorian species. In these cases sawmills with the flexibility to produce alternative dimensions and source less common, higher value species may find potentially profitable opportunities by supplying small volumes to marine construction projects. Durable mixed species that might lend themselves to marine constructions include river red gum yellow stringybark, mountain grey gum.
4 Hardwood Markets and Product Trends

- **Heritage timbers** – Where local supply opportunities arise, there may be the potential to obtain attractive prices in supplying small volumes of high quality, hard-to-source timbers, to heritage building or infrastructure owners for re-construction and/or maintenance of historic buildings, bridges and other structures.
- **Fencing timber** – in local areas there may be strong localised areas of demand for supplying fencing timber to the farming sector. This may provide opportunities for sawmills to obtain better value from lower grade timber or for enterprises to establish as small scale processors.
- **Firewood** – where an adequate and accessible supply of pulpwood or forest residues can be obtained and where localised demand is strong, small business opportunities may be available in supplying homes and businesses with firewood for heating.

### 4.2.5 Pulp and paper

<table>
<thead>
<tr>
<th>Summary of pulp and paper market opportunities and risks</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Key opportunities</strong></td>
</tr>
<tr>
<td>• Opportunity for expansion of existing Maryvale asset if market remains stable and input costs (including resource costs) allow.</td>
</tr>
<tr>
<td>• Opportunities for investment into productivity improvements and environmental initiatives to improve cost position and demonstrate environmental and social credentials to customers and the community.</td>
</tr>
<tr>
<td>• New regulations on illegally sourced wood products may limit the importation of paper products that cannot demonstrate legal chain of custody. This could put Australian produced paper into a more favourable competitive position.</td>
</tr>
<tr>
<td>• Opportunities for better branding paper products produced from Australian forests to demonstrate and reinforce the product’s environmental credentials relative to competitors.</td>
</tr>
</tbody>
</table>

**Key risks**

• Deteriorating manufacturing cost environment in Australia requires an exceptionally strong business case in order to make a new pulp and paper mill proposal a viable prospect.

Woodchips are produced as a by-product of native harvesting operations in Victoria. Hardwood woodchips have a short fibre length that makes them well suited to the production of pulp for high quality printing and writing papers. The Australian Paper pulp and paper mill at Maryvale in Victoria is currently the only significant producer of hardwood pulp in Australia. The Maryvale mill is a major pulpwood customer of VicForests and has a long term legislated supply agreement in place. Around one-third of the resource inputs for the Maryvale mill are provided from native forests, and the remaining two-thirds is sourced from plantations and recycled waste (Australian Paper, 2012).

Figure 4-18 illustrates the apparent consumption of printing and communication paper in Australia over the last decade, and shows that domestic supply is currently dominated by imports. Production of printing and communication paper in Australia has declined since 2009 following the closure of two Tasmanian hardwood pulp mills at Wesley Vale and Burnie.
The high level of imports in Australia is partly the result of the high costs of production of Australian producers compared to international competitors. New mills based throughout Asia are large scale and generally utilise the latest production technologies. The input cost profile of these producers is often also highly competitive against Australian benchmarks. Despite this, the cost competitiveness of Australian producers could be strengthened through targeted capital investment in the mill production processes that focus on reducing operational costs.

Australian producers would also benefit from engaging with consumers to help them better understand the environmental credentials and social benefits of the industry. Although campaigns to date have had successes, the industry would benefit from better partnering with key stakeholder groups and government to directly address both the public perception of the industry and corporate and government paper procurement policies. Strengthening the demand base for Australian produced paper is a critical task for the industry at present where international paper imports are increasingly competitive. The industry will find benefits in building on its close proximity and familiarity with Australian customers, by engaging more deeply with the public and stakeholder groups and reconsidering product branding and positioning to set itself apart from international products.

Other investments in the industry’s production processes may also provide indirect market benefits. The Maryvale mill is currently undertaking a solid waste reduction plan which will educate staff in improving materials re-use and recycling across the mill’s operations (Australian Paper, 2011). Initiatives such as this undertaken by the Victorian hardwood industry are cumulative and demonstrate the company’s and the industry’s corporate social responsibility. The impact of initiatives like the solid waste reduction plan can be quite tangible in terms of addressing unforeseen operational costs, creating demonstrable and credible achievements for potential consumers and potentially improving the company’s social licence to operate amongst the broader community.
4 Hardwood Markets and Product Trends

New pulp and paper mill investment in Victoria is likely to need a highly competitive business case to be successful, as pulp mill operations are generally energy and labour intensive and favour lower cost operating environments, increasingly situated in Asia. The Chinese and Brazilian hardwood pulp industries have been expanding rapidly over the last 5 years. On the eastern seaboard of China, a number of major hardwood pulp mills have been commissioned that are located in close proximity to ports where they have easy access to an imported woodchip supply, predominantly sourced from Vietnamese Acacia plantations. Australia presents a challenging environment for proposing new pulp and paper developments particularly in the current economic climate where the delivered price of pulp to international markets is heavily impacted by exchange rates.

4.2.6 Woodchip exports

<table>
<thead>
<tr>
<th>Summary of woodchip export market opportunities and risks</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Key opportunities</strong></td>
</tr>
<tr>
<td>• There will be ongoing demand for native forest woodchip from China as paper demand increases internationally.</td>
</tr>
<tr>
<td>• There is scope to increase supply to the Chinese market without compromising price, although prices achieved will be substantially less than the Japanese market which increasingly is supplied by certified plantation woodchips.</td>
</tr>
<tr>
<td><strong>Key risks</strong></td>
</tr>
<tr>
<td>• Prices for woodchips are volatile being subject to the vagaries of trends in international supply and demand and in the movement of exchange rates and freight prices.</td>
</tr>
</tbody>
</table>

Australian woodchips have historically been traded almost exclusively in the Pacific Rim market. The Pacific Rim woodchip market is driven largely by Japanese demand and to a lesser extent by China and South Korea.

Japan relies predominantly on imported hardwood fibre to supply its pulp production sector. Between 1994 and 2008, annual Japanese hardwood chip imports had increased from approximately 9 million bone dry metric tonnes (bdmt) to 12 million bdmt. In 2009, when domestic paper production fell, the demand for hardwood chip imports also fell by around 26%. Japan has historically relied on imports of both native forest and plantation woodchip to meet its demand; however, the Japanese market has a preference for plantation woodchips due to the perception amongst consumers that plantation forestry is more environmentally sustainable.

China has been the world’s largest producer of paper since 2008 when it overtook US production output. Since 2000, the growth of paper production in China has increased almost three fold, despite the international impact of the GFC (Figure 4-19). Historically, China has relied on non-wood fibres, low quality domestic sources of pulpwood or imported wood pulp rather than importing large quantities of woodchips for pulp conversion. However, since 2000, Chinese paper production has grown particularly fast, resulting in corresponding growth in demand for pulp and woodchips (Figure 4-20).
China’s current woodchip supply means that ongoing developments in pulp production capacity will most likely result in a further increase in demand for woodchip imports. Where possible, China will continue to source low cost woodchips from the Asia-Pacific for these mills. However, the price of woodchips from current suppliers will be influenced by pulp industry developments in their own countries, particularly in the case of Vietnam and Indonesia where a number of green field developments are proposed. Constraints in supply from these suppliers may place upward pressure on prices and leave Australia in a stronger position as a key fibre supplier. This is a positive outlook for Australia, particularly for native woodchips, which will eventually be diverted from Japan into alternative markets (such as China) due to growing Japanese preference for plantation woodchips.

The price of Australian woodchip exports to Japan increased steadily in nominal terms from 2000 to 2008, reaching a high in 2008, with free on board (FOB) prices of $A185/bdmt for native chip and $A207/bdmt for Tasmanian blue gum E. globulus plantation chip. These prices were maintained in nominal terms since 2009 despite the market downturn however price negotiations in early 2012 were reported to have resulted in a price decrease for both plantation and native forest woodchips.

Generally woodchips are traded internationally in US dollars. In the case of the Japanese market, Australia is an exception and trades directly in Australian dollars. As a result, the Australian woodchip Cost, Insurance, Freight (CIF) price often exhibits different price trends because of exchange rate movements that are unique to Australian supply contracts. As the Australian dollar strengthens against the US dollar, Australian hardwood chips become more expensive relative to other producers and less cost-competitive as a fibre source for Japanese buyers. The appreciation of the Australian dollar since early 2009 has decreased Australia’s competitiveness in US dollar CIF terms.

---

7 The Free on Board price of an internationally traded good is the price of producing and delivering a good up to the point of loading on delivery transportation to the buyer. An FOB price therefore excludes freight, insurance costs and foreign exchange risk but includes delivery to a port of export and loading onto a vessel where relevant.

8 The Cost, Insurance and Freight price of an internationally traded good is the price producing and delivering the good to the buyer’s port of destination, inclusive of insurance, freight and other delivery costs.
Given that Australia is currently the highest cost supplier to the Japanese market, there is likely to be pressure for Australian exporters to lower prices in order to align the price of Australian woodchips with its international competitors.

Chinese buyers generally pay lower prices for hardwood chips than Japanese buyers and import predominantly from the immediate south east Asian region. Anecdotal evidence suggests that China’s predominant concern is maintaining a low cost fibre source rather than other factors such as woodchip quality or species preferences. This is reflected in the substantially lower CIF prices that Chinese buyers pay and in the fact that Chinese buyers appear to more readily import Australian native woodchips where Japanese buyers are showing increasing hesitancy. Figure 4-21 shows the quarterly average CIF price trend in US dollars for major countries supplying China.

Woodchip export will remain an important market for woodchips produced through the harvest of hardwood forests in Victoria. The reduction in export price will place some pressure on native forest woodchip exports and there is also the risk that the Japanese market for native forest woodchip will continue to shrink.

On the other hand, China presents a market opportunity for native forest woodchip. As pulp capacity in China increases in coming years, the country will look for increasing supplies of better quality woodchip. However, export to China will be constrained by high exchange rates.

![Figure 4-21 Quarterly CIF price of hardwood chip exports to China (US dollars)](Source: Global Trade Atlas (2012))
4 Hardwood Markets and Product Trends

4.3 Review of new or emerging hardwood markets

Outside of existing hardwood markets there are a range of prospective markets that are new or only recently emerging as potentially viable alternative markets for Victorian hardwood producers. As producers and consumers continually look towards more durable, lower cost, and more environmentally friendly materials, there are a range of forms by which the hardwood industry can respond to these changing preferences.

| Summary of emerging hardwood market opportunities and risks |
| Key opportunities |
| • Providing production is feasible, Engineered Strand Lumber may be a strong product opportunity for producing a lower cost, high strength hardwood alternative to laminated veneer lumber that instead of utilising sawlogs, utilises pulplogs and other residual log resource. |
| • Cross laminated lumber is a new product that is beginning to be used in Australia and holds strong potential for faster and more sustainable construction. Although untested as a hardwood product and with only an emerging demand base, it may have the potential to revolutionise low rise, high density residential and commercial construction. |
| • The hardwood industry should explore further the potential for veneer and/or plywood production based on Victorian hardwood resource, including plantations. Australia currently relies on a large volume of imported plywood and there is strong scope for either import replacement of internationally sourced plywood or export of veneer for offshore production (either outsourced and re-imported, or on-sold to the end customer as veneer). |
| • Bioenergy and biofuels production presents an important opportunity for boosting the value of hardwood forest production. A lack of government support for bioenergy supplied by native forest feedstock currently constrains this market opportunity however plantation supplied proposals are still supported. Wood pellet export may present an alternative market to the woodchip export market that the native hardwood industry can supply in anticipation of future adjustments to renewable energy policy around native forest biomass. In addition there may be cost-effective opportunities for processors to invest in on-site bioenergy technology where sufficient residues are produced and electricity and heat requirements can be adequately fulfilled. |

| Key risks |
| • New and emerging products often only have a fledgling demand base and the development of a commercial scale facility in many cases would precede an adequate level of demand, necessitating export of the product or a staged approach to mill development. |
| • Investing in the manufacture of new products requires an in depth feasibility study which may uncover a range of more detailed project risks. |
4 Hardwood Markets and Product Trends

4.3.1 Engineered strand lumber and board products

### Summary of Engineered Strand Lumber market opportunities and risks

#### Key opportunities

- There is a case for the introduction of Engineered Strand Lumber (ESL) and board products in Australia based on the assumption that they are a lower cost but high standard alternative to LVL and solid wood products and potentially steel.
- It is reasonable to assume that resource efficient products such as ESL that can use lower cost and quality logs will stand at a competitive advantage to other more conventional products.
- Composite wood products from eucalypts tend to exhibit high strength (MOR) and stiffness (MOE) properties.

#### Key risks

- A comparatively large mill would be required for it to be competitive in export markets. The fibre supply needs of such a mill are equivalent to the medium term outlook for VicForests ash supply.
- Significant marketing work is required to establish demand for these products in Australia.
- Composite wood products from eucalypts tend to have issues relating to internal bond strength of the glues and resins used in their manufacture.
- The basic density of Victorian eucalypt products tends to be higher than what is considered optimal. This also causes these products to be quite heavy.
- Research is required for assessing the suitability, and overcoming any identified problems associated with using native grown Victorian hardwood species for ESL products.

Steady advancements in wood product technology have led to the development of a group of high strength Engineered Strand Lumber (ESL) products.

Laminated Strand Lumber (LSL) and Oriented Strand Lumber (OSL) are manufactured by producing strands of wood fibre, typically from lower grade logs, then recombining and pressing the strands in parallel with a resin. Different stranding technologies are used depending on the manufacturer and product. Continuous presses are often used, enabling wood products of exceptional length to be manufactured. Steam injection technology also means that comparatively thick panel products can also be produced. The technology is similar to that employed in many Oriented Strand Board (OSB) facilities.

LSL and OSL products have been produced in the US and Canada for over a decade through a range of processing variations which include Weyerhaeuser’s Timberstrand® and Parallam® products and Louisiana-Pacific’s (LP) SolidStart® range of LSL products. In North America LSL is often made from hardwood species including poplar, aspen and maple.

LSL is a potential substitute for house framing, particularly for higher strength and larger dimension applications. LSL could potentially compete with large dimension timber (including LVL) and steel products for heavy, weight-bearing applications.

LSL and OSL type products have several advantages over traditional solid wood products in that they have more stable moisture content of below 10% which makes them less prone to twisting and warping after installation. This allows producers to provide more comprehensive warranties with their products. The products are of consistent quality, and have good machining and nail holding ability.
4 Hardwood Markets and Product Trends

Furthermore, the chemical resin used means that the products can be highly durable and chemical additives, including fire retardants, can be combined to enhance performance.

In 2007, the Australian company Lignor developed commercial plans to produce an LSL product using plantation and indigenous eucalyptus species (which they have referred to as ESL – engineered structural lumber). Lignor had plans to build a large scale production facility in WA, Australia. The proposed plant intended to utilise continuous press technology similar to that employed in many North American LSL facilities. Lignor had commenced raising capital for the WA mill but this was delayed due to the impacts of the global financial crisis.

Table 4-1 reviews key development considerations for the development of a hardwood based ESL product.

<table>
<thead>
<tr>
<th>Consideration</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fibre Supply needs</td>
<td>• Able to utilise both hardwood and softwood feedstocks</td>
</tr>
<tr>
<td></td>
<td>• Research required to confirm the suitability of native grown Victorian</td>
</tr>
<tr>
<td></td>
<td>hardwood species</td>
</tr>
<tr>
<td></td>
<td>• Input of 300 – 400,000 m$^3$ produces around 250 – 300,000 m$^3$</td>
</tr>
<tr>
<td>Victorian hardwood suitability</td>
<td>• Further work required to confirm the suitability of Victorian hardwoods</td>
</tr>
<tr>
<td></td>
<td>however should technical problems be overcome, it is potentially suited</td>
</tr>
<tr>
<td></td>
<td>to lower quality Victorian resource</td>
</tr>
<tr>
<td>Scale of investment required</td>
<td>• URS believes that a mill producing 250-300,00 m$^3$ of product would</td>
</tr>
<tr>
<td></td>
<td>have a capital cost of approximately $AU225 – 275M</td>
</tr>
<tr>
<td>Skill needs</td>
<td>• Training would be required for roles specific to the technology</td>
</tr>
<tr>
<td>Market Size</td>
<td>• Potentially large – could capture market share from LVL, solid wood</td>
</tr>
<tr>
<td></td>
<td>and steel</td>
</tr>
<tr>
<td>Marketing requirements</td>
<td>• Demand for the product in Australia will need to be created</td>
</tr>
<tr>
<td></td>
<td>• If export is intended, marketing of the Australian product will be</td>
</tr>
<tr>
<td></td>
<td>required</td>
</tr>
<tr>
<td>Supply chain dynamics</td>
<td>• The use of ESL products may lead to further pre-fabrication of buildings</td>
</tr>
<tr>
<td></td>
<td>thus increasing the connection between processors and builders and</td>
</tr>
<tr>
<td></td>
<td>potentially bypassing the need for wholesalers and retailers</td>
</tr>
<tr>
<td>Policy implications</td>
<td>• Support for research investigating the suitability of native grown</td>
</tr>
<tr>
<td></td>
<td>Victorian hardwood species</td>
</tr>
</tbody>
</table>
4 Hardwood Markets and Product Trends

4.3.2 Cross Laminated Timber

**Summary of Cross Laminated Timber market opportunities and risks**

**Key opportunities**
- Offers the building industry a product that significantly reduces construction time and can be marketed as sustainable and energy efficient.
- Allows timber processors, designers and builders to work together and produce customised product according to strict specifications.
- Allows the wood products industry to potentially significantly increase its penetration within the multi-storey building market.
- Should the Victorian industry product a Cross Laminated Timber (CLT) like product, it may be able to capitalise on the market’s acceptance and testing of the imported product.
- The range of mill sizes offers the Victorian industry flexibility in terms of initial capital investment.

**Key risks**
- There is uncertainty about long term market uptake of the product in Australia.
- The suitability of Victorian hardwoods and how they compare to softwoods and the product currently being imported from Europe has not been investigated.
- Training would be required to manage and operate the CLT technology.

Cross Laminated Timber (CLT) is an innovative building system used to construct for single- and multi-unit residential and commercial buildings. CLT is produced by gluing layers of structural timber together in alternating directions to produce a large dimension panel. Cross-laminated timber is commonly used in the construction of external and internal walls, ceilings and roofs, where panels are pre-fabricated according to the designs of the building and are fitted together at the construction site during the building construction phase.

The building material offers the construction industry the advantages of a very short assembly time and a high level of control of the building process with tight specifications that are driven from the production of the CLT product through to the construction of the building. According to a NZ producer, construction time is typically in the order of 20% of that for an equivalent construction using concrete (XLam, 2012). The reduction in construction time also has the advantage of reducing the financing requirements to the developer and hence risk.

The market for CLT is also growing worldwide because it is able to be marketed as a highly sustainable material compared to concrete and steel which are both commonly used for multi-unit residential buildings. There is no break in the insulation layer and no need for a moisture barrier in walls. The board properties are typically air tight, fire resistant and noise and temperature insulated.

The best application for CLT is currently considered to be in buildings 5-10 storeys high. It is also considered an effective solution in ‘big box’ warehouse type buildings. There is less consensus overall as to whether it is appropriate product for the private housing sector in Australia.

It is difficult to make estimations regarding how much market share CLT might capture in the Australian market as the CLT market in Australia is only just emerging. However, its future in Australia would appear bright. The construction company Lend Lease is currently building the world’s tallest timber apartments, a project called ‘Forte’ in Melbourne, made possible through the use of CLT. The CLT used for this building is from imported product. Following on from the Forte project, Lend Lease
4 Hardwood Markets and Product Trends

has stated that it anticipates that in the future 30-50% of their residential projects will be made from CLT and other applications are also under consideration including educational, community and commercial buildings. Grocon has announced another similar project using CLT, also in Melbourne. Assuming that other builders will also adopt CLT as a construction material, these projects suggest that uptake of the product could be both substantial and fast. A CLT product made from Victorian hardwoods could fulfil some of this demand.

Table 4-2 reviews key development considerations for the development of a hardwood based CLT product.

<table>
<thead>
<tr>
<th>Consideration</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fibre supply needs</td>
<td>• Output of CLT typically ranges from 5,000 m$^3$ – 60,000 m$^3$</td>
</tr>
<tr>
<td></td>
<td>• Timber input requirement is uncertain</td>
</tr>
<tr>
<td></td>
<td>• Typically made from softwood</td>
</tr>
<tr>
<td>Victorian hardwood suitability</td>
<td>• Has not been investigated</td>
</tr>
<tr>
<td>Scale of investment required</td>
<td>• A 30-40,000 m$^3$ output mill would cost approximately $US30 - $40M in capital costs</td>
</tr>
<tr>
<td>Skill needs</td>
<td>• Training would be required for roles specific to CLT technology</td>
</tr>
<tr>
<td>Market Size</td>
<td>• Difficult to estimate but potentially significant as able to compete against solid wood, steel and concrete</td>
</tr>
<tr>
<td>Marketing requirements</td>
<td>• Marketing efforts are required to educate the building, architecture and design industry about how to design and build with CLT. Marketing considerations may include:</td>
</tr>
<tr>
<td></td>
<td>— Identifying short, medium and long term goals for CLT in the Australian market</td>
</tr>
<tr>
<td></td>
<td>— Undertake market testing to test costs and user preferences with builders, designers, architects and users (i.e. purchasers of CLT buildings)</td>
</tr>
<tr>
<td></td>
<td>— Building partnerships and alliances between sawmills, distributors and developers</td>
</tr>
<tr>
<td></td>
<td>— Identify custom ‘flag-ship’ opportunities e.g. Forte Building</td>
</tr>
<tr>
<td></td>
<td>— Support advocacy groups with promotion material to increase awareness</td>
</tr>
<tr>
<td>Supply chain dynamics</td>
<td>• The use of CLT would dramatically alter supply chain dynamics in the Victorian hardwood industry. A direct relationship would be formed between building designer and/or architect and CLT processor thus bypassing the need for retailers or wholesalers.</td>
</tr>
<tr>
<td>Policy implications</td>
<td>• Support for research investigating the suitability of native grown Victorian hardwood species</td>
</tr>
<tr>
<td></td>
<td>• Seek specific recognition within green building certifications</td>
</tr>
<tr>
<td></td>
<td>• Develop a generic Australian standard</td>
</tr>
</tbody>
</table>
4 Hardwood Markets and Product Trends

4.3.3 Veneer and plywood

**Summary of veneer and plywood market opportunities and risks**

**Key opportunities**
- Opportunity for a locally made product to replace some plywood imports;
- If produced at a competitive price, export opportunities may also exist (particularly veneer export) as supply from tropical forests is further constrained.
- Rotary mills, similar to the ‘Ta Ann’ mill in Tasmania, may allow for product to be based on lower quality native forest resource and plantation sawlog resource.

**Key risks**
- The price of plywood in Australia has been falling, placing pressure on the ability for an Australian mill to produce a cost competitive product.
- More work is required to understand the suitability of the Victorian hardwood resource.
- The Victorian resource, particularly the lower quality resource, may only be suitable for the core veneer or plywood where appearance is not important.

While plywood and veneer are not new products per se, production based on the Victorian hardwood resource would be a new product for the Victorian hardwood industry and hence its consideration in this section.

Global plywood production capacity has increased significantly over the last few years, mainly due to the increase in production capacity in China (Figure 4-22). The US and China are the world’s major plywood producers and key markets are Japan and the US. China, Malaysia and Indonesia are the major exporters of plywood globally.

Hardwood plywood is preferred in appearance uses and in high strength applications such as for concrete formwork and flooring. However, softwood plywood and OSB have been replacing hardwood plywood as supplies have reduced due to reductions in tropical native hardwood availability.

![Figure 4-22  Global plywood production](image-url)
4 Hardwood Markets and Product Trends

Source: FAOSTAT (2012)

Apparent consumption of plywood in Australia has grown at an average rate of 2.1% pa since the late 1980’s. Whilst it has fluctuated over the last ten years, apparent consumption is around the same level as it was in 2002. Some of the market share of plywood has been captured by LVL (Figure 4-23). Australia’s production of plywood has decreased since 2002, with the volume replaced by imports. Imports have been particularly strong in recent times on the back of the high Australian dollar. Much of the growth in imports has been from Chile. Australia’s imports of plywood from Chile increased from 19,000 m³ in 2007-08 to 35,000 m³ in 2009-10.

Plywood mills in Australia are generally old mills with scales of production ranging from around 5,000-45,000 m³ pa, considerably lower than what would be considered competitive at a world scale. The exception is the Carter Holt Harvey plywood mill in Myrtleford, Victoria, which has recently been commissioned to replace the old plywood mill. According to the Carter Holt Harvey website, the new mill was commissioned because running costs and reliance on out-dated processes were no longer competitive, or sustainable. There are six softwood plywood producers in Australia but only one hardwood plywood producer. The mill, Big River Timbers, is relatively old and is in NSW where native forest resources are becoming increasingly constrained and delivered wood costs consequently rising.

The price of plywood in Australia has fallen since the beginning of 2009, largely as a result of competition from imports (Figure 4-24).
The Malaysian based company ‘Ta Ann’ opened two rotary veneer mills in Tasmania in 2007. The veneer mills process lower quality native hardwood logs, a large proportion of which were previously chipped for woodchip export. The two mills have a production capacity of around 145,000 m$^3$ pa. The veneer sheets are exported and manufactured into plywood overseas. The strength and durability of Australian eucalypts provides a competitive advantage, creating niche sales in overseas markets, particularly plywood for flooring in Japan.

Given the high level of plywood imports, there appears to be potential for construction of further capacity in Australia to satisfy domestic demand. Any new mill would need to compete with import prices, and a competitive plywood mill would require an annual log input of at least 120,000 m$^3$ pa. There would also be opportunities for hardwood plywood export as supplies from tropical forests continue to decline.

Further analysis of the Victorian native forest resource and the detail about critical ply aspects such as presence of knots or defects within logs, and log straightness, length and diameter, along with a better understanding of the costs of extracting and delivering such wood, would be critical elements of a veneer/plywood mill feasibility study.

There may be potential for the plywood/veneer to be produced from some of the lower quality Victorian resource however because internal defects are difficult to detect prior to peeling it may be challenging to produce a veneer that is suitable for plywood faces/backs. Furthermore, while it is possible to saw around a defect (i.e. produce boards from the remainder of the log), a single defect tends to repeat through all veneer sheets when logs are peeled. The veneer sheets that might be produced from the lower quality resource are therefore more likely to be more suitable for use as core veneer or for non-appearance grade plywood where strength is an important factor. It may also be the case that the export of veneer to Asia for the manufacture of plywood is attractive as plywood can be manufactured at a lower cost in Asia than in Australia.

Source: URS (2012)
4 Hardwood Markets and Product Trends

Table 4-3 reviews key development considerations for the development of hardwood plywood and veneer.

Table 4-3  Plywood and Veneer – review of key development considerations

<table>
<thead>
<tr>
<th>Consideration</th>
<th>Comment</th>
</tr>
</thead>
</table>
| Fibre supply needs            | • Log input ideally 200,000 m³ but 120,000 m³ as a minimum  
                                | • Can potentially be based on a lower quality hardwood resource                                                                       |
| Victorian hardwood suitability | • Envisaged that Victorian hardwoods would be suitable for veneer and plywood production                                             
                                | • Research required around a range of aspects including knots and defects within logs, straightness, length and diameter         |
| Scale of investment required  | • For a mill with input of 200,000 m³, URS estimates a capital cost of around $AU100 million                                               |
| Skill needs                   | • Skills development required in the specific technology implemented in the mills                                                      |
| Market size                   | • Apparent consumption of plywood in Australia is currently around 250,000 m³ per year                                                |
| Marketing requirements        | • As an established product in the Australian market place, marketing efforts will need to focus on educating the market about the availability of Australian made plywood and veneer  
                                | • If the veneer that is produced is for appearance (rather than as a core) demand for the aesthetics of the specific Victorian species may need to be developed |
| Supply chain dynamics         | • It would be expected that supply of plywood and veneer into the market would follow the traditional supply chain                  |
| Policy implications           | • Support for research into the feasibility of a world scale plywood/veneer mill based on Victorian hardwoods                           |
4 Hardwood Markets and Product Trends

4.3.4 Bioenergy and biofuels

**Summary of bioenergy & biofuels market opportunities and risks**

**Key opportunities**

**Bioenergy**
- There are growing opportunities for bioenergy production based on woody biomass feedstocks.
- The Renewable Energy Target (RET) provides government support to utilise wood processing waste and residues from the management of forest plantations.
- The maturity of bioenergy technology internationally means that production costs have lowered and bioenergy production is increasingly viable in localised areas where either production costs can be lowered significantly or demand for on-site energy production is high.
- A range of technologies exist for generating electricity from wood biomass which includes being able to combine it with other biomass fuel sources.
- There is proven commercial interest for using wood residues at both the enterprise level (e.g. to generate heat and electricity for use on site) as well as for commercial energy production.

**Pellets**
- There is a growing international market for wood pellets, although the price has been stable over recent years.
- Pellets can be produced from low quality wood and harvesting residues.

**Biofuels**
- The production of wood based biofuels holds strong prospects as a future market for wood residues however the market is currently in its infancy with only demonstration plants being developed internationally and significant research and development still required to improve production methods and lower unit costs.

**Key risks**

**Bioenergy**
- Unclear support from the Australian Government for the emerging bioenergy sector is a limiting factor in its development.
- Constraints associated with the RET include not being able to utilise residues from the harvesting of native forests.
- Internationalisation of the carbon pricing mechanism including the removal of a price floor may make purchasing credits more affordable and emissions reductions such as bioenergy less attractive.

**Pellets**
- Wood pellets intended for the international market may find it hard to compete given the current high Australian dollar and relatively high production costs.

Bioenergy refers to the production of renewable energy (electricity, heat and liquid fuels) based on biomass. There is growing interest in Australia to produce renewable sources of energy in response to government and stakeholder concerns regarding energy security, climate change and the effect of burning fossil fuels for energy production.

**Bioenergy**

In 2010 the bioenergy market in Australia was estimated to be generating revenues of around $400 million, producing around 2,500 gigawatt-hours (GWh). Over the past five years, electricity generation
4 Hardwood Markets and Product Trends

in Australia has been relatively flat, while bioenergy has grown at an average annual rate of around 15% (Figure 4-25).

Figure 4-25  Australian electricity production

The Clean Energy Council’s (CEC) Bioenergy Roadmap highlights the potential for almost 11,000 GWh of new bioenergy in Australia by 2020 and almost 73,000 GWh by 2050, of which forestry and wood residues has the potential to contribute around 25% by 2020 (approximately 3,000 GWh), and 7% in the longer term (approximately 5,000 GWh) (CEC, 2008).

Biomass feedstocks include agricultural residues, urban waste, forestry and wood processing residues and waste. Residual woody biomass from forest harvesting operations in plantations and native forests includes branches and the tops of the trees that are generally left on site to rot, or are burnt. It is estimated that there is enough woody biomass from forest industry activities in Australia to supply 3,000 GWh of renewable energy per year from existing waste streams with no additional harvesting.

Several technologies exist for generating electricity from woody biomass including direct combustion of wood, co-firing with other fuel sources, and via the production of fuels through gasification. The following outlines each of the main technologies, each of which may be produced at a range of scales:

- **Direct combustion** is the best established and most commonly used technology for converting biomass to heat. The biomass is combusted to produce heat and raise steam, which is expanded in a turbine or steam engine to drive an electric generator.
- **Co-firing** or co-combustion of biomass with coal and other fossil fuels can provide a low risk, low cost option for increasing renewable energy production while simultaneously reducing the use of fossil fuels. Co-firing involves utilising existing fossil fuel power plants (generally coal fired), and replacing a small portion of the fossil fuel with renewable biomass. Australian examples of co-firing

---

4 Hardwood Markets and Product Trends

include Macquarie Generation’s Liddell power station in NSW and Verve Energy’s Muja power station in WA.

• **Gasification** of biomass takes place in a restricted supply of air or oxygen at temperatures up to 1,200–1,300°C. The resultant fuel gas may then be burnt to generate heat; alternatively it may be processed and then used as a fuel for gas-fired engines or turbines to drive generators.

At present direct combustion from smaller wood-fired plants and co-firing in existing coal-fired plants are the two main sources of bioenergy production. A number of sawmills and paper producers in Australia are utilising their own wood waste to generate heat and electricity on site (Table 4-1).

<table>
<thead>
<tr>
<th>Company</th>
<th>Location</th>
<th>Capacity MW</th>
<th>Product</th>
<th>Feedstock</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gunns</td>
<td>Launceston, TAS</td>
<td>3</td>
<td>Water tube boiler</td>
<td>Dry chip / shavings</td>
</tr>
<tr>
<td>Nestle</td>
<td>Gympie, QLD</td>
<td>16</td>
<td>Water tube boiler</td>
<td>Coffee waste, wood waste</td>
</tr>
<tr>
<td>Gunns</td>
<td>Georgetown, TAS</td>
<td>20</td>
<td>Water tube boiler</td>
<td>Wood waste</td>
</tr>
<tr>
<td>Hyne &amp; Son</td>
<td>Tumbarumba, NSW</td>
<td>15</td>
<td>Thermal oil heater</td>
<td>Wood waste</td>
</tr>
<tr>
<td>Carter Holt Harvey</td>
<td>Oberon, NSW</td>
<td>12</td>
<td>Thermal oil heater / Fibre drying</td>
<td>Wood waste</td>
</tr>
<tr>
<td>AKD Sawmills</td>
<td>Colac, VIC</td>
<td>15</td>
<td>Thermal oil heater</td>
<td>Wood waste</td>
</tr>
<tr>
<td>Hyne &amp; Son</td>
<td>Tuan, QLD</td>
<td>12.5</td>
<td>Thermal oil heater</td>
<td>Wood waste</td>
</tr>
<tr>
<td>Laminex</td>
<td>Gympie, QLD</td>
<td>24</td>
<td>Thermal oil heater</td>
<td>Wood waste</td>
</tr>
</tbody>
</table>

Source: Bioenergy Australia (2010)

There are around 30 bioenergy producers in Victoria of varying scale, producing over 120 MWh of renewable energy per annum (Regional Development Victoria, 2012). Many of these bioenergy facilities are attached to industrial facilities utilising production waste. The largest is the bioenergy plant at Australian Paper in Maryvale, which uses ‘black liquor’ produced as part of the wood conversion process, to produce approximately 54MW. Another forest products manufacturer, D&R Henderson – a particleboard producer located in Benalla – has recently installed gasifiers at its mill site to utilise waste wood residues and power their drying operations, significantly offsetting natural gas consumption (Regional Development Victoria, 2012). At Eden, near the Victoria/NSW border, South East Fibre Exports (SEFE) has undertaken feasibility studies to develop a bioenergy facility based on production hardwood residues, however, this project remains on hold as a result of the current Australian Government RET regulations pertaining to native forest based bioenergy.

According to the International Energy Association (IEA, 2007), investment for wood-fired plants is around $AU2,600 to $AU4,100 per kW of energy produced. The investment for co-firing is lower, at $AU160 to $AU1,600 per kW of energy produced, depending on the type of biomass and the co-firing configuration. For a 500 MW facility with 5% co-firing, this corresponds to an investment of $AU4 to $AU40 million.

The future price of carbon is crucial for the competitiveness of bioenergy production. It is expected that bioenergy will increasingly become competitive with other energy sources on a price basis with the introduction of a carbon price in Australia and its subsequent increase in value. However the internationalisation of the carbon pricing mechanism with the EU emissions trading scheme, announced in 2012, including the removal of a price floor in the domestic market, may lower the
4 Hardwood Markets and Product Trends

carbon price making carbon credits more affordable and emissions reductions such as bioenergy less attractive.

Under this scheme non-renewable energy sources will be liable for purchasing carbon credits to offset their emissions of greenhouse gases. Bioenergy producers will not be liable for their emissions under this scheme. At present, residues from the harvesting of native forests are not eligible forestry sources for bioenergy (see page 65). In addition to the impacts of government policies the importance of gaining public acceptance of bioenergy should not be underestimated.

**Combined heat and power plants**

Small-scale combined heat and power (CHP) plant technology based on 100% wood feedstock exists and are well suited to energy users located in close proximity to the feedstock (to minimise transport distances). For example, Finland is a significant exporter of wood products and produces 22% of its energy requirements through the combustion of forest industry wood residue for energy generation (CEC 2008).

While Australia has a different climate to Finland, there are still expected to be market opportunities for this type of bioenergy production process in Australia. Although undeveloped, potential sources of CHP production could include large municipal facilities such as swimming pools, processors of agricultural production (abattoirs, feed and seed producers), wood processors and the mining sector, particularly where these operations occur close to, or in conjunction with timber harvesting operations.

**Pellets**

There are opportunities to supply international markets by exporting wood particles as feedstock for bioenergy production. Wood biomass used in the production of electricity can come in a variety of forms, the most common of which is wood pellets. Wood pellets are a standardised form of wood bioenergy produced by grinding wood material into small particles, then compressing the material through a perforated matrix which acts to heat and bind the wood together. Because wood pellets only require low quality wood they can be produced from forestry and wood product processing residues. Wood pellets have higher bulk density, and therefore higher energy content per unit volume than woodchips. As such, they represent a more cost effective method of transporting woody biomass over long distances.

A wood pellet plant has been operated by Plantation Energy in Albany, based on supply from forest plantation residues. Its production has been export-focussed, supplying power stations in Europe. However, in late 2011, Plantation Energy announced they were closing the operation. This is understood to be due to a combination of poor market conditions in Europe, the strong Australian dollar and higher than expected production costs at the plant. At Eden, NSW, SEFE has developed a pilot wood pellet production plant based on a small volume of chipping residues produced at the site. SEFE is looking to develop domestic markets for this product which up to now have not been extensively promoted\(^ \text{11}\).

The international market for wood pellets is forecast to grow significantly in the longer term internationally. According to the IEA Bioenergy Task 40 Wood Pellet Industry Market and Trade report, consumption of wood pellets grew by 110% between 2006 and 2010 to approximately 13.5 million tonnes and it is estimated consumption by 2020 could be around 50-60 million tonnes. The majority of

the demand is expected to remain in Europe; however, Asia (particularly China, India and South Korea) and North America (although likely to be self-sufficient) are also expected to grow.

The price for wood pellets in Europe has been relatively stable over the past 12 months with prices ranging from €22.6 to €23.2.

**Biofuels**

Biofuel production is an emerging market for forest products. It involves the production of a liquid fuel from plant biomass for the purpose of transportation, heating or electricity production. There is currently strong interest in biofuels worldwide, largely as a solution to problems associated with fossil fuel use, including the effects on global climate and limitations in global oil supplies. However, there is also a global debate on the issue of “food vs. fuel” – the ethics of domestic agricultural subsidies to increase the production of biofuel feedstocks that can also be used for food (Doornbosch & Steenblik, 2007). This debate has stimulated increased interest in the prospects for non-food, lignocellulosic based biofuels.

Bioethanol can be produced from lignocellulosic feedstocks through the conversion of the cellulose and hemicellulose contained within biomass feedstocks into sugars which are then fermented into ethanol (IEA, 2007). Lignocellulosic ethanol has the potential to perform better in terms of energy balance, GHG emissions and land-use requirements than primary, starch-based (e.g. corn, sugar cane) biofuels (IEA, 2007). The lignocellulosic process is currently being developed at the demonstration plant level but has not yet received the investment to take it to full commercial production. This is likely to be due to the process not yet being sufficiently cost-competitive with other transportation fuels (either at a standalone level or with available government support). However the process is currently a topic of intense research and development within the energy sector and is likely to be developed on a significantly larger scale in coming years.

Biomass to liquid’ (BtL) fuels are also being researched internationally as a sustainable, alternative fuel for transportation. Like lignocellulosic ethanol, BtL fuels are seen as a more sustainable alternative to first generation biofuels, particularly biodiesel, which utilises oil seed feedstocks (e.g. canola, palm). BtL fuels are produced by a two-step process in which biomass is converted to ‘syngas’ rich in both hydrogen and carbon monoxide (IEA, 2011). After cleaning, the syngas is synthesised into a broad range hydrocarbon liquids, including synthetic diesel and bio-kerosene products. Unlike ethanol, BtL fuels can be used in current diesel engine technology as a stand-alone fuel (Enecon, 2007). Like lignocellulosic ethanol there is significant interest in the potential for BtL fuels to play a strong role in energy security and sustainable transportation. As such there is strong ongoing research into the production of BtL fuels and demonstration plants (albeit at sub-commercial scale) have been developed in Europe and the United States.

As demonstration of the growing interest by the transportation industry, the airlines Qantas and Virgin Australia have both indicated that they are investing in biofuel technology to increasingly fuel their aircraft fleet. Thus far Qantas has announced that it has one flight operating on biofuel, based on cooking oil. Virgin has announced its support for the development of renewable jet fuels. This includes research into the development of jet fuel from native mallee trees grown in West Australia.

To enable the most cost competitive production of biofuels it is likely that any production of biofuel products based solely on woody biomass would utilise relatively low cost harvest residues and salvage grade wood. The significant impact of freight cost on this relatively low value fibre source
4 Hardwood Markets and Product Trends

would likely necessitate any future plant being located within a close proximity to the source of biomass.

Renewable energy policy

The development of bioenergy in Australia is supported by the Renewable Energy Target (RET) legislation, which was designed to ensure that 20% of Australia’s electricity supply is obtained from renewable sources by 2020.

The legislative framework comprises the *Renewable Energy (Electricity) Act 2000*, *Renewable Energy (Electricity) Charge 2000* and the *Renewable Energy (Electricity) Regulations 2001* (the regulations). The framework encourages electricity retailers and wholesale electricity buyers on liable grids in all States and Territories to contribute proportionately towards increasing Australia’s renewable energy sources.\(^\text{12}\)

The RET is designed primarily to bring forward the deployment of the least-cost currently available renewable energy technologies by funding the difference between the average wholesale price of electricity and the cost of renewable energy production.

The range of biomass sources that are eligible under the RET scheme\(^\text{13}\) have changed. Currently eligible forms of forestry feedstock include wood processing wastes and residues from the management of forest plantations but of significant importance to the Victorian native hardwood industry, not residues from the harvesting of native forests.

Impact of the Carbon Pricing Mechanism on the demand for bioenergy

Ultimately the extent to which biomass energy provides a cheaper source of energy will be dependent on the location and scale of bioenergy operations, the level of compensation provided to clean energy producers and the its cost competitiveness against alternative sources of energy such as coal fired energy production.

Under the Australian Government’s Clean Energy Future Plan, forest biomass is rated carbon neutral, meaning biomass energy generation will not incur a penalty. Under the carbon pricing mechanism, energy produced from processes and fuel sources that are covered by the scheme are likely to face higher costs of production, which may increase the competitiveness of biomass energy. However, in August 2012, the Australian Government announced a plan to allow the trade of carbon credits between the European Union emissions trading scheme and Australia’s carbon market from mid-2018. The Australian Government has also stated that the price floor on Australian carbon credits will be reduced at this time. These developments in the market have the potential to allow significantly lower the cost of carbon credits in Australia and reduce the cost advantage to low carbon energy production such as bioenergy.

Government support for the development of renewable energy

As part of the Australian Government’s Clean Energy Future plan (of which the carbon pricing mechanism is part), they have announced a range of programs that support the development of renewable energy and low carbon development plans. While it is worth the forest industry considering these programs, it is the view of URS that it is unlikely that the Australian Government will support the development of bioenergy programs that use native forest waste as the feedstock. As such, the

---


\(^{13}\) Renewable Energy (Electricity) Act 2000 – Section 17 – What is an eligible renewable energy source?
4 Hardwood Markets and Product Trends

programs, outlined below, are more likely to be applicable to bioenergy generated from plantation waste.

- **Clean Energy Finance Corporation (CEFC)** – Will invest in the commercialisation and deployment of renewable energy, energy efficiency and low-pollution technologies. It will also invest in manufacturing businesses that provide inputs for these sectors. CEFC will invest A$10 billion over five years from 2013-14;
- **Australian Renewable Energy Agency (ARENA)** – A$3.2 billion program to support research and development, demonstration and commercialisation of renewable energy; and
- **Clean Technology Programs** – Will provide grants of up to A$1 billion over seven years, for firms to invest in energy efficient capital equipment and low-pollution technologies, processes and products.

The Victorian Government also provides a range of assistance to help facilitate the development of bioenergy and biofuels sectors in Victoria (Regional Development Victoria, 2012). Key assistance packages include:

- **Regional Growth Fund** – a $1 billion fund administered by Regional Development Victoria to provide infrastructure projects (including energy projects) of regional or state wide significance with funding to help commence operations; and
- **Energy Technology Innovation Strategy** – administered by DPI this fund provides pre-commercial low-emission energy technology projects with financial assistance.
Supply chain and industry competitiveness

The industry’s supply chain is the physical production pathway of a forest product as it travels from a raw material through to a value-added product with the end consumer. The nature of this supply chain and important factors of the supply chain that aid and inhibit the industry’s competitiveness will be discussed as part of this chapter.

The processing industry’s competitive position is dynamic and is a function of the health of the business activities of industry participants. It is important for the competitiveness of the industry to be well understood before it can undertake innovation to either remedy areas of poor competitiveness or to adopt a new path that takes industry activities away from these areas. Section 5.1 outlines the nature of the Victorian hardwood industry’s supply chain and discusses past changes and possible future changes to the supply chain as a result of current trends, both within and outside the control of the industry. Section 5.2 looks at factors that influence competitiveness and the status of competitiveness in the Victorian hardwood processing industry.

### Summary of supply chain and competitiveness

**Key supply chain opportunities**

- Selling more directly to end users of hardwood timber products to:
  - Reduce spread of margins;
  - Improve efficiency; and
  - Increase responsiveness to consumers.

- Where domestic manufacturing costs are unviable, consider outsourcing/offshoring of production rather than export of raw materials. By engaging a different company in the manufacturing process but re-importing the processed goods, marketing benefits of Victorian hardwoods can be maximised through product pricing.

**Key processing competitiveness opportunities**

- Consider consolidation of disparate sawmilling operations and re-investment in processing technology.
- Most competitive individual operators should consider increasing scale to improve profitability
- Increased automation in production lines, including scanners, stackers, higher recovery mill lines.
- Consideration of renewable on-site energy (electricity and heat) production using wood residues.
- Industry transition toward ‘processing hubs’, where production sites are optimised relative to resource and markets but also to resource, knowledge and enterprise sharing arrangements.

### 5.1 Breakdown of the Victorian hardwood supply chain

Depending on the product being produced, the supply chain for the Victorian hardwood processing industry can vary quite widely. In sawmilling, wholesalers will typically be used to distribute products to retailers.

Supply chains have a bearing on the processing industry’s competitiveness in terms of the:

- Cost of additional linkages (e.g. distributors) between the producer and the end user, including the margins paid to distributors;
- Logistical challenges, including the effectiveness and efficiency of product transfer, handling and sales and marketing processes; and
5 Supply chain and industry competitiveness

- Closeness of the producer to their customers as far as understanding the changing needs of the end user.

Table 5-1 shows a broad outline of typical linkages in the supply chain for various hardwood products downstream from the processor. The table is indicative only and should not be considered to represent all possible marketing channels that hardwood processors utilise. The supply chain for timber products can be multi-staged and complicated. A large volume of product is distributed through wholesaler channels that specialise in supplying the fragmented merchant/retailing sectors. This reduces the direct responsibility (but not the need) for sawmills to understand the needs of end users. Larger companies in the hardwood and softwood sawmilling sectors often operate their own wholesaling arms to focus on reducing sales costs and understanding the market better, however this is generally not the case within the Victorian hardwood industry.

With primary or secondary manufactured goods such as furniture and joinery, the supply chain typically has two manufacturing stages and one to two stages where the product is delivered to the end users.

Table 5-1  Outline of supply chain linkages for various products

<table>
<thead>
<tr>
<th>Product</th>
<th>1st stage</th>
<th>2nd stage</th>
<th>3rd stage</th>
<th>4th stage</th>
<th>5th stage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Timber products</td>
<td>Sawmill</td>
<td>(Wholesaler)</td>
<td>Merchants/Retailers</td>
<td>Builder</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sawmill</td>
<td>Frame &amp; truss</td>
<td>Builder</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Furniture</td>
<td>Sawmill</td>
<td>Re-manufacturer</td>
<td>Merchants/Retailers</td>
<td>Consumer</td>
<td></td>
</tr>
<tr>
<td>Joinery/mouldings</td>
<td>Sawmill</td>
<td>Re-manufacturer</td>
<td>Merchants/Retailers</td>
<td>Consumer</td>
<td></td>
</tr>
<tr>
<td>Pulp and paper</td>
<td>Pulp mill</td>
<td>Paper mill</td>
<td>Merchants/Retailers</td>
<td>Consumer</td>
<td></td>
</tr>
<tr>
<td>Woodchip export</td>
<td>Chipper</td>
<td>Pulp mill</td>
<td>Paper mill</td>
<td>Merchants/Retailers</td>
<td>Consumer</td>
</tr>
<tr>
<td>ESL</td>
<td>ESL mill</td>
<td>Merchants/Retailers</td>
<td>Builder</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CLT</td>
<td>Sawmill</td>
<td>CLT plant</td>
<td>Builder</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plywood</td>
<td>Plywood mill</td>
<td>Merchants/Retailers</td>
<td>Builder</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bioenergy</td>
<td>Bioenergy plant</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

NB: ( ) – Indicates that, in some circumstances, this stage may be skipped.

Figure 5-1 shows supply chain scenarios for a number of products produced by sawmills and a number of sales channels. These pathways have been illustrated for demonstrating the opportunities that are available to processors by exploring alternative approaches to the supply chain.
5 Supply chain and industry competitiveness

The following points explain the paths outlined in Figure 5-1:

- **Path A** – shows the typical hardwood timber supply chain between sawmills, wholesalers, retailers and the building industry. While the product has only undertaken a primary level of value adding, there are a number of linkages in the supply chain and limited opportunities for feedback between the building industry and the sawmilling industry.

- **Path B** – shows a more fit for purpose product, where value adding to the timber product occurs at a frame and truss plant, which liaises directly with the building industry on orders, product specification and product development over time. The direct linkage allows the frame and truss producer to better understand the needs of customers and respond through internal product development.

- **Path C** – shows a fit for purpose product such as CLT where the product is highly specialised and produced to order according to the needs of the building industry. For a product such as CLT this type of business relationship is critical as when the product is introduced there will be an important period where the company will need to grow demand by demonstrating the benefits of their product. The closer the relationship with the building industry at this stage the better. With product variations that are more design-driven to specific customer needs (e.g. the emerging market for CLT), producers work more closely with customers and the supply chain is likely to be significantly shorter, requiring less spreading of margins and potentially higher returns. In this case the product is also responding more directly to customer demand.

- **Path D** – shows the supply of furniture and other secondary products from the Victorian processing industry where production may be more profitable either as a niche, domestically-manufactured product or with production outsourced to offshore processors and re-imported, finished and marketed in Australia as a Victorian hardwood product.
5 Supply chain and industry competitiveness

5.2 Competitiveness

5.2.1 Factors affecting competitiveness

For hardwood processors already operating in the Victorian market, competitiveness is the extent to which they can produce their products more profitably than their competitors. In the case of F17 for instance, this reflects the unit margin a mill can make on a standard piece of timber relative to other mills. Sawmills that are competitive with relatively low production costs generally are not only more profitable but have more flexibility in their pricing strategies against competitors.

Figure 5-2 outlines a framework for understanding the competitive environment of a typical business. The arrows around the centre circle represent external forces that can impact the competitiveness of existing industry players. In the case of industry competitors, this reflects the various operators within Victorian hardwood markets.

![Figure 5-2: Porter’s ‘five forces’ of industry competitiveness](image)

Source: Porter (2008)

The following sub-sections outline each of these four external forces as they relate to the Victorian hardwood processing industry.

**Bargaining power of suppliers**

The bargaining power of suppliers is considered to be medium.

VicForests is the major supplier of logs to the Victorian hardwood processing industry and as such has significant influence in the pricing and availability of raw materials for the industry. While VicForests
5 Supply chain and industry competitiveness

Supply can be supplemented by other hardwood log resources (as discussed in Section 3), these additional resources are currently estimated to represent only a very small proportion of the total log resource consumed.

Although VicForests’ is maximising its own profitability it’s bargaining power is constrained by the need to maintain a viable domestic industry for its hardwood log resource. As such VicForests generally will only work to ensure a fair price is received for logs and that changes in its own production costs are captured through the price of its resource.

In the future hardwood plantations may be a second major source of supply of hardwood logs, however the supply is likely to be split across several plantation growers and will be predominantly pulpwood. Also, because the majority of the pulpwood is located in the Green Triangle region of Victoria, the pulpwood supply may not necessarily stay in Victoria but could easily be directed to a new processing investment located in South Australia.

Other suppliers of materials to hardwood processors (such as chemicals suppliers) may have high levels of bargaining power however the cost of these materials relative to sawlog/pulpwood costs is generally likely to be smaller and concentrated supply would be of less impact.

The typical purchasing volume of a large hardwood processor (e.g. sawmill, ply mill or pulp and paper mill) may also be large and the relative bargaining power of these processors may help to balance out any bargaining power of suppliers.

**Threat of a new entrant**

The threat of a new entrant is considered to be **low** for pulp and paper and furniture but **medium** for sawn timber, plywood, mouldings and joinery. Prospective emerging products such as engineered strand lumber and CLT are not considered as they do not yet have established markets.

The hardwood timber industry in Victoria is predominantly a mature industry where, through much of the standard product range, there are limited opportunities for new companies to come into the market and gain highly profitable positions. As a result, there have been very few new entrants in the hardwood sawmilling industry in recent years. There is considered to be an even lower likelihood of new entrants in larger assets such as pulp and paper where capital requirements are very high and long term supply agreements would usually be negotiated. Declining growth sectors such as furniture are also likely to possess a low likelihood of new entrants due to eroding profitability in traditional segments of this market.

Opportunities for new entrants in the above markets may be limited in traditional market segments, however there are still a range of innovation opportunities, particularly in the sawmilling industry where value can be added to products and new market segments can be explored. There is a chance that this could stimulate either acquisitions or new developments in their own right. It is difficult to estimate the exact likelihood of these developments occurring. A new development would necessitate sufficient resource being available and the right combination of financing, technology, skills, location and input costs being secured.

**Bargaining power of buyers**

The bargaining power of buyers is considered to be **medium**.
5 Supply chain and industry competitiveness

Where there are a large number of customers to buy the industry’s product, typically the industry will be in a much better position to negotiate more favourable prices. In general, the wood products industry has a large number of customers that can be supplied with product, due to the popularity of wood products and their various forms and applications. Wood products are sold into timber wholesaling and retailing sectors but also to re-manufacturers such as frame and truss, furniture, and mouldings companies. Changes have occurred in the retailing sector over the past 10 years that have encouraged growth and rationalisation amongst operators. Box 5-1 below provides further detail on these changes.

Box 5-1: Changes in the timber retailing sector

In recent years there has been consolidation in the timber retailing sector in Australia. The emergence of super hardware stores is catering to the increasingly popular DIY market where it is capable of offering customers increasingly low prices due to its buying power. Mitre 10 and Timber Home and Hardware are longer standing examples of this type of hardware stores, however it is the expansion of Bunnings and more recently Masters that stand to have the biggest impact on the processing industry supply chain. The growth of large volume customers is likely to improve the bargaining position of these timber buyers. Where these companies also have extensive international procurement networks, they may be able to source substitute hardwood products from overseas at a significantly reduced cost to local products.

However, while there is some potential for these relatively new players in the market to seek even lower timber prices from sawmills, several factors should be taken into consideration:

• At the same time as consolidation has occurred in the timber retailing sector, the market has also grown;
• Anecdotal evidence suggests that while Bunnings has a strong ‘presence’ in the market, their purchase volumes may be smaller than expected, with some estimates suggesting this company occupies around 10% of the trade in softwood timber;
• For many products, Bunnings and Masters negotiate directly with sawmills, removing the need for paying a wholesaler’s margin on large volume products. The savings generated are potentially likely to produce a better result for sawmills and the retailer; and
• There may be advantages in dealing with larger volume customers instead of smaller volume customers simply in the fact that it is likely to reduce sales and marketing costs as less negotiations, customer service and general interaction will be needed with a lower number of customer businesses.

Threat of substitutes

The threat of substitutes is considered to be high.

The hardwood processing industry has faced substantial competition from substitute products over time as lower cost softwood products have gained market share, particularly in the structural and outdoor timber markets. More recently, LVL products have increased their market share, competing against softwood and hardwood products particularly in standard structural and high load bearing applications (see Section 4.1 for more detail).

The currently high cost of manufacturing in Australia and the high dollar, mean that imports are increasingly competitive. Imported hardwood timber products have had a significant impact on the competitiveness of the Victorian industry, particularly in secondary products including paper production and in the market for hardwood furniture, joinery and mouldings and decking. Competition
5 Supply chain and industry competitiveness

...is expected to increase further in the flooring market as a result of low cost engineered flooring products such as bamboo flooring, which will occupy the lower end of the market and potentially take some of the medium end also.

There may also be new products in the residential building industry that could absorb market share from hardwood and softwood timber producers. As discussed in Section 4.3, the advent of CLT and other products such as ESL, hold the potential of supplying the commercial and residential construction markets with potentially lower cost or more attractive alternative products. The new products currently emerging are likely to be a few years away from significant uptake by industry, they eventuate at all, however the potential for their introduction is considered quite high.

5.2.2 Status of the industry’s competitiveness

Without detailed information on company accounts, the competitiveness of the Victorian hardwood processing industry can be inferred through several indicators:

1. **Relative production costs of competing mills** – How expensive is it to produce 1 m$^3$ of wood at one mill compared to another? This can help to understand relative profitability between mills that are producing the same products.

2. **Relative selling price of competing mills** – The price of one equivalent product against another (in a market where products are not highly differentiated).

3. **Extent to which processors supply distant markets** – If the industry is not supplying product into an international or other distant market this may be because it lacks the ability to sell its products at a competitive price, in particular absorbing the cost of freight, insurance and exchange rate differences.

4. **Trends in the market pricing of substitute products** – Price trends that can be observed between products that are different but compete against each other in the same market (e.g. F17 and MGP10/12).

The first two indicators generally cannot be assessed in great detail without having permission to review company accounts. This is because businesses normally treat cost and sales data as commercial-in-confidence. However, some comments can be made based on anecdotal information. The second two indicators of competitiveness can be assessed more clearly and are reviewed in the sub-sections below.

It should be noted that in general, the smaller the market that a processor operates in (where less substitute products are available) the less competitors there are and the less relevant competitiveness considerations become.

**Sawmilling**

The competitiveness of Victorian hardwood sawmills varies considerably from mill to mill. There is limited information with which to specifically assess how profitable Victorian processors are relative to one another, and how this may be affected by product out-turn.

In general hardwood sawmills do not require the same scale as softwood sawmills to be competitive. However scale remains a very important factor in competitiveness between hardwood mills. By operating larger more efficient milling equipment, mills can reduce the unit cost of producing timber. Table 5-2 shows that on average Victorian hardwood sawmills operate at a relatively large scale compared to hardwood mills in operation in other states.
5 Supply chain and industry competitiveness

<table>
<thead>
<tr>
<th>Sawmill sawlog intake volume (m³ pa)</th>
<th>Victoria</th>
<th>New South Wales</th>
<th>Western Australia</th>
<th>Queensland</th>
<th>Tasmania</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;10,000</td>
<td>10</td>
<td>&gt;30</td>
<td>~10</td>
<td>&gt;20</td>
<td>~15</td>
</tr>
<tr>
<td>10,000-50,000</td>
<td>9</td>
<td>7</td>
<td>4</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>50,000-100,000</td>
<td>1</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;100,000</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>21</strong></td>
<td><strong>40</strong></td>
<td><strong>14</strong></td>
<td><strong>26</strong></td>
<td><strong>23</strong></td>
</tr>
</tbody>
</table>

Source: URS industry estimates

In addition to scale, other key drivers of profitability include: the efficiency of capital employed and debt/equity levels; fixed and variable production costs; product grade recovery; and, the alignment and balancing of resource costs (i.e. delivered log costs) with product market values (i.e. sawn timber and other product prices).

The number of shifts that mills run will also have a significant bearing on profitability. Relative to a single shift, a double shift will increase running time and output while maintaining the same level of capital investment – i.e. capital costs are spread over a greater output.

In this context, the investment returns of small older mills with depreciated values can be higher than mills of a medium size operating on a single shift. While smaller mills with depreciated equipment will be subject to relatively higher maintenance costs and therefore a lower throughput compared to new sawmills, they can generate better returns than newer, single-shift operations based on significantly lower capital costs.

Some smaller sawmills supplying niche product markets may also not be directly comparable to the more major product streams. This is particularly the case with mouldings, joinery and furniture manufacturers who produce a more diverse product range into markets – this makes benchmarking cost competitiveness more difficult.

Victorian sawlog prices, on average, are supplied at the higher end of the log price spectrum in Australia. The introduction of an auction system for log sales in Victoria acted to increase the delivered cost of logs. By comparison, New South Wales, Queensland and WA have slightly lower delivered prices than Victoria. Tasmania is generally seen to be the most competitively priced native hardwood sawlog supplier. With the cost of logs being a significant component of the variable costs of sawmilling it is possible that Victorian sawmills may in general terms, have higher unit costs of production than sawmills in other states however this could not be tested without reviewing the cost structures of a sample of representative sawmills. Victorian sawmills have been able to offset the cost of logs by operating at a larger than average production scale.

**Longer term cost trends**

Figure 5-3 shows the Producer Price Index (PPI) – a historic measure of national costs of production – for log sawmilling and dressing relative to the broader costs of manufacturing and to the Consumer Price Index (All groups). The data shows that the production cost of timber sawmilling in Australia has increased more than the general manufacturing industry since 2004. The cost of manufacturing has increased by 48.5% since June 2004 compared to 60% for log sawmilling and timber dressing. This equated to 4.8% pa for manufacturing compared to 5.8% pa for log sawmilling and timber dressing.
5 Supply chain and industry competitiveness

Figure 5-3  Change in the cost of wood products manufacturing

Source: ABS (2012c; 2012d)

Competitiveness in the pulp and paper sector

The Victorian pulp and paper industry has faced a deteriorating cost position over the last 10 years as a result of an aging capital base and increasing costs of production, including labour and energy costs. The Maryvale mill has responded positively to the cost challenges by investing in on-site bioenergy that utilises production residues, undertaking a major recycling initiative and significantly reducing both its water use and carbon emissions (Australian Paper, 2012; PPIS, 2010).

However, pulp and paper’s competitiveness in Australian has declined. Both pulp and paper are globally traded commodities, traded in US dollars and increasingly produced in large scale facilities. Paper use in Australia has fallen but imported paper has managed to capture market share in this declining market, with stable volumes imported, while Australian production has been scaled back (see Section 4.2.5). Australian pulp and paper manufacturers will need to continue to strategically evaluate its product mix to ensure that it responds proactively to changing needs of consumers, including the increasing demand for packaging solutions.

The declining competitive position of the Australian pulp and paper industry has meant that production assets have been under the microscope. Most of the paper companies in Australia are global players and this means that local divisions must compete for limited company investment dollars with other divisions in other countries (PPIS, 2010). Compared to 20 years ago, the international pulp and paper market is much more closely monitored and understood, and companies are prioritising their limited investment budget on their more profitable international production sites. With such wide international supply networks, companies can easily move their product to different locations as to supplement
shortfalls in local supplies and closure of a domestic mill generally does not mean withdrawal from a domestic market.

5.2.3 Price competitiveness of hardwood timber products

Hardwood structural timber products have generally become less competitive in the Australian market as softwood timber products (including LVL products) have increased in availability, sale price and consumer acceptance. These products in many cases are sold in direct competition with structural hardwood timber. The reducing price of softwood products over time has placed pressure on the margins that hardwood sawmills are able to achieve in the structural market. The result is that many hardwood sawmills are supplying the structural market much less profitably and often rely on diversified revenue streams from selling appearance and industrial grade timber products.

There is less substitutability in the market for appearance grade timber products as product characteristics and origins are more diverse and more highly valued in the market. Victorian ash appearance grade products tend to operate at the lower end of the price segment compared to NSW and Queensland timber species (see Figure 4-14), and as such it often fills a market segment from a price point of view.

The fragmented nature of the hardwood processing industry across Australia and localised market catchments, often mean that hardwood producers predominantly operate in discrete markets. The volume of product traded interstate varies according to product and distance from the market. While a portion of Victorian sawn timber production is consumed in Sydney and other parts of NSW, the majority of volume goes to markets throughout Victoria. Queensland consumes only a small amount of Victorian hardwood products – this is because it has ready access to Queensland and NSW produced hardwood products and the longer transport distances of Victorian markedly reduce the competitiveness of Victorian product.

Australia’s largest competition from internationally produced hardwood timber products come from Indonesia and Malaysia. There are increased complexities in benchmarking production costs between Australian sawmills and international competitors. The difference in the price and accessibility to hardwood logs and lower production costs in key competitor countries means that even after freight, customs and distribution costs, hardwood timber products from Malaysia and Indonesia can compete strongly, particularly in the Australian market for hardwood decking and other products.

5.2.4 Improving the industry’s competitive position

While there are a range of possible improvements that can be made to the cost competitiveness of processors, there are no simple formulas for dramatically improving the cost position of all operators. Part of a company’s response to improving its strategic position should always be on the market side assessing whether its product mix best fits market demand. However changes to production costs more directly affect competitiveness and would directly address any underlying weakness in company operations.

Table 5-3 and Table 5-4 present a SWOT (Strengths, Weaknesses, Opportunities and Threats) analysis of the sawmilling and pulp and paper sectors respectively.
5 Supply chain and industry competitiveness

Table 5-3  SWOT analysis of sawmilling cost position

<table>
<thead>
<tr>
<th>Comments</th>
</tr>
</thead>
</table>
| **Strengths** | • Product that is attractive, durable and environmentally sustainable  
• Knowledge of collective industry |
| **Weaknesses** | • Fragmented industry largely producing common product  
• Aging capital base  
• Changing resource specification and location |
| **Opportunities** | • Consolidation and re-investment in processes would provide a clear improvement in industry competitiveness and profitability  
• On-site bioenergy generation from production residues to produce electricity, and supply heat to kilns, steam bending machinery and thermal modification processes where appropriate  
• Lower volume niche product opportunities  
• Increased scale of production  
• Increased levels of automation (scanners, stacking, grading, edge optimisers)  
• Improvements to log recovery to improve unit costs of production  
• Processing hubs to improve efficiency (transport, materials etc)  
• Investment in employee skills to lower labour costs, improve efficiency and enable use of newer technology |
| **Threats** | • Consumer preferences moving to engineered and fit for purpose products  
• Uncertain public support for industry  
• Declining availability of resource, increasing resource cost |

Table 5-4  SWOT analysis of pulp and paper cost position

<table>
<thead>
<tr>
<th>Comments</th>
</tr>
</thead>
</table>
| **Strengths** | • Maryvale mill is located centrally to key domestic markets allowing relatively short transport distances and better customer networks  
• Secure, nearby access to forest resources  
• Strong community support |
| **Weaknesses** | • Aging capital base  
• Increasing electricity and labour costs  
• Declining domestic industry, including issues representation |
| **Opportunities** | • On-site bioenergy generation to reduce electricity costs and generate renewable electricity  
• Increased use of recycled feedstock  
• Re-alignment of paper product mix to take advantage of changing domestic preferences |
| **Threats** | • Growing investment in pulp and paper production in Asia that can often compete at lower cost  
• Uncertain public support for industry |
Developing a Climate for Innovation

It is commonly cited that innovation is an effective means for a firm to increase both profits and its competitive advantage (Abernathy and Clark 1998). There is evidence to suggest that the importance of innovation for improving productivity growth has increased over time. However, innovation does not occur in a predictable fashion that allows an enterprise to predict the role that innovation might play in delivering those productivity improvements.

While innovation might be incremental in fashion, it can also be radical, unpredictable and disruptive in its nature. Indeed the more radical the innovation, the more widespread the effect of it may be throughout the economy. The ability for an industry to identify important new products is crucial for it to be able to maintain a competitive edge.

Innovation impacts individual firms but is also known to have a ripple effect through other firms within a sector and potentially the broader economy. However while the benefits of innovation are regularly espoused to business, investment in innovation often does not occur unless there is a demonstrable and acceptable investment opportunity, including clear returns within an acceptable risk environment (DIISR, 2011).

The following section provides information for the Victorian hardwood processing industry:

• Defines the broad types of innovation;
• The importance of, and how to, foster a climate for innovation;
• The role of education and skills development and education;
• The critical role that collaboration plays in the successful development of innovation; and
• Innovation and the forestry sector.

Summary of priorities for developing a climate for innovation in the Victorian hardwood processing industry

Key opportunities

• A framework for innovation utilising the so-called ingredients of expertise, interaction, diversity and application provides a practical and logical framework for the Victorian hardwood processing industry to utilise for the effective development of innovations
• At the enterprise level, studies have found that climate for innovation and innovation strategy had a very strong bearing on a company’s innovativeness, and innovativeness in turn had a strong effect on business performance
• By implementing effective positional factors, hardwood processing enterprises can transition away from producing simply products that compete on price
• A workforce underpinned by a talent pool of people with both university and VET qualifications is vital for enterprises to identify and implement opportunities for innovation
• The importance of collaboration to effective innovation is increasingly being recognised
• There is merit in exploring options for creating ‘clusters’ or regions that are focussed on innovation and the activities that support innovation
• The global forest sector has historically been characterised as being mature, production oriented with little customer focus
• An opportunity exists for the Victorian hardwood process industry to build on the findings of existing reports on the forest and broader manufacturing industry
6 Developing a Climate for Innovation

6.1 Types of innovation
Roos (2011) defines two types of innovation that can be executed within the firm:

- **Value creation** – technology based, design based and efficiency-improving innovations are used to increase the value created in the firm; and
- **Value appropriation** – business model innovation and effectiveness-improving innovation are used to maximise the share of this created value that can be appropriated by the firm.

Innovations associated with value creation innovations are often related to product or process innovations while those associated with value appropriation, are related to ‘business systems’ improvements.

6.2 Fostering a climate for innovation
Successful development of innovation is not easy. It requires an appropriate mix of natural, human and capital resources to be coupled with an effective process for initiating ideas and applying or commercialising them. The following section sets out a framework for fostering innovation both across an industry and within an enterprise.

6.2.1 An innovation framework for the Victorian hardwood processing industry
The Pew Center on the States and the National Governors Association in the United States examined the literature on the topic of innovation to develop a useful framework to describe the so-called necessary ‘ingredients’ for effective innovation (see Figure 6-1). These were identified as:

- **Expertise** – new discoveries, new knowledge, and new insights come from all people who are given the resources necessary for success;
- **Interaction** – face to face is still very important for the exchange of ideas and synergy that creates new business models, marketing plans, or products;
- **Diversity** – ideas will only get better when they are openly discussed and considered by a mix of people with a variety of research fields, backgrounds, approaches, and mind-sets; and
- **Application** – ideas are useless unless used. The true proof of their value is in commercialisation.
6 Developing a Climate for Innovation

**Figure 6-1 Ingredients for successful innovation**

This framework provides a practical and logical framework for the Victorian hardwood processing industry to utilise for the effective development of innovations. While it has not necessarily been intentionally using the framework outlined above, examples exist within the forest industry that demonstrate the use of the so-called ‘ingredients’ outlined above to successfully develop and implement a range of innovations (see Boxes 6-1 and 6-2).
6 Developing a Climate for Innovation

Box 6-1: Adoption of a process innovation in the Victorian hardwood processing industry: Machinery Automation and Robotics

Forest and Wood Products Australia (FWPA) has contributed funding to the development of a new robotic system for sorting and stacking timber. The system, developed by Machinery Automation and Robotics (MAR), can sort and stack timber simultaneously and will reduce the level of manual labour required. The MAR system can provide several benefits to sawmills including:

- Improved efficiency and output rates
- Reduced operational costs
- Reduced material waste
- Helping to reduce injury and fatigue

The FWPA funding enabled MAR to further develop an existing system to suit the requirements and conditions of a broad range of timber stacking, movement and storage situations, and to undertake factory testing. The robotic technology was then presented to 18 hardwood and softwood timber processors in northern NSW, Victoria and Western Australia.

Fennings sawmill in Gippsland is one of the first sawmills to use the new system. Fennings has installed two robots which will take all timber from the sawmill’s docker and stack up to 15 packs by length at a rate of 12 boards per minute.

With regard to the successful implementation of innovation, this project is a good example of the importance of:

- Expertise: Involvement from people both within and outside the timber industry to develop an effective and cost effective process innovation
- Interaction: Interactions between a variety of individuals and organisations to customise and implement the technology
- Diversity: Involvement of individuals from a range of backgrounds and organisations
- Applications: While the company MAR and FWPA identified the opportunity that robotics could deliver to the processing industry, it required Fennings to make the capital and operational investment to implement and demonstrate the value of the innovation

6 Developing a Climate for Innovation

Box 6-2: Investment and development of a system to detect internal checking

Checking is the appearance of very fine cracks in the surface of timber products. Checking occurs in many hardwood species and reduces the suitability of timber for appearance grade uses, and hence reduces its value. There is often no external sign of the occurrence of internal checking and it is often not detected until the last stage of timber manufacture. It can therefore lead to wastage or costly rectification.

In 2008, ITC implement a process to research and develop a system to detect internal checking. The project was undertaken in collaboration with research providers and technology developers and involved the following process:

- Literature review to identify potential detection methods. This review identified several methods, including non-contact ultrasound, which is being used by Weyerhaeuser in the US.
- Samples were sent to the US for initial testing, with positive results.
- Larger samples were then evaluated by Ensis scientists and this research confirmed that it is possible to detect internal check using non-contact ultrasound.
- A US company with suitable technology, Airstar, visited the ITC sawmill in Heyfield to gain a better understanding of the project and discuss potential solutions.
- A development plan was drawn up.
- 600 slabs of timber were evaluated by Airstar.
- The final design of the technology was developed.
- The equipment was installed and personnel received training from Airstar.

The new system allows internal checks and defects to be isolated in the sawing process and timber containing internal checking can be excluded from appearance grade products. It provided the benefit of increasing recovery of higher value products, reducing waste and providing greater confidence with species prone to checking.

With regard to the successful investment and implementation of innovation, this project is a good example of the importance of:

- Expertise: Incorporate of expertise from both within and outside the timber industry in Australia and internationally to develop an effective and cost effective response to an identified problem.
- Interaction: Interactions between project participants included face to face.
- Diversity: Involvement of individuals from a range of backgrounds and organisations.
- Applications: The innovation was successfully implemented delivering a range of benefits to the enterprise.

Source: Australian Sustainable Hardwoods

6.2.2 Fostering innovation within the enterprise

Crespell and Hansen (2007) at Oregon State University undertook a study of business level cultural factors that foster creativity and innovation and influence business performance in the forest products industry. In summary, the study found that climate for innovation and innovation strategy had a very strong bearing on a company’s innovativeness and innovativeness in turn had a strong effect on business performance. Secondary wood products processors were found to be better than other types of wood products businesses at converting innovation into better performance. Business strategy was not found to impact the relationship between innovativeness and business performance. Resistance to change was found to be the main impediment to innovation.

Implications from the study for wood products managers included:

- Firm performance can be improved by being innovative;
6 Developing a Climate for Innovation

- A firm’s structure and functions should be integrated with innovation processes including allocating the resources and creating channels for ideas generation and implementation, while promoting a culture favourable to change. This includes championing of the principle of innovation, lowering employee resistance to change and creating the appropriate mechanisms for continuous learning, improving and creating;
- Reinforcing a management style of support and camaraderie that can be replicated by middle managers with floor employees can improve innovation uptake;
- Setting clear and common goals and principles can develop cohesion;
- Stimulating exploration and risk taking and allocating the time and resources to do so creates an environment where employees are more open to change; and
- Exploring different types of innovation such as organisational, markets and information technology.

Complementing the Pew Centre framework (Figure 6-1) and the findings by Crespell and Hansen is a set of guidelines developed by Roos (2011) for firms manufacturing competing in high cost, international competitive environments. The guidelines describe how businesses can position themselves in this environment to maximise returns and remain competitive and relevant. Critical positional factors that businesses within the Victorian hardwood processing industry should consider include:

- Highly niche;
- Highly knowledgeable;
- Focussed on products as well as services that accompany them;
- Managed by people that are highly experienced in the industry;
- In close cooperation with customers;
- Innovative in value creation & value appropriation; and
- Strongly linked with knowledge institutions.

By adopting these positional factors, hardwood processing enterprises can transition away from producing simply products that compete on price (and potentially quality) to enterprises that work closely to understand their customer’s needs, regularly think about how they can be more valuable in terms of products and services and collaborate closely with other institutions that can be of assistance in the value creation process.

6.3 Education and skills development

Effective leadership and management are considered vital for firms to effectively utilise the skills within their organisations to identify opportunities for innovation. The skills that are required for innovation may be learned on the job however the basis for the knowledge associated with identifying, creating, and implementing innovation are typically based on formal training, both within the higher education (i.e. university) and VET sectors (Australian Workforce and Productivity Agency, 2012).

While there are no generic skills for innovation per se, a workforce that is underpinned by skilled workers with science, technology, engineering, mathematics, management, design and marketing are vital for developing new products, processes, markets and finding new ways of using existing ideas. Such skills are typically delivered through universities, and then developed and nurtured in the workplace (DIISR, 2012).
6 Developing a Climate for Innovation

Innovative firms also have a strong talent pool of people with vocational skills such as trades and technicians, marketing and finance, information technology and business management. Vocational skills are most likely to be delivered via the VET sector. In line with recommendations provided within the Pulp and Paper Industry Strategy (2011), there is an important role for Forestworks, in association with training providers such as Timber Training Creswick and ForestTech to play with regard to workforce planning and development initiatives to ensure that the industry is supported by employees that have both the technical skills in new and emerging technologies, products and manufacturing processes but also have a strong understanding of innovation.

As highlighted previously, for the innovative potential of an organisation to be harnessed, it must have the right ‘climate’ for innovation (see Section 6.2.2). As quoted in the final report from the Prime Minister’s Taskforce on Manufacturing (DIISR, 2012):

“High performance workplaces are characterised by a set of shared values and beliefs where people welcome and seek to introduce change and innovation, where leaders care for their employees and foster collaboration, and where there is an ambition to deliver results and a focus on achieving goals” (Boedker et al, 2011).

The Taskforce’s report concludes that ‘if Australian manufacturing is to remain competitive in a relatively high cost environment, a substantive and shared commitment to innovation is needed, based on developing capabilities, aligning around outcomes, and engaging.’

Education and an ongoing commitment to skills development will be a key element to the manufacturing industry being able to achieve such a goal.

6.4 The role and value of collaboration

Innovation is an interactive, multidisciplinary process. While innovation at the enterprise level is important and many of the ideas for innovation within the firm originate from its employees, the basis for ideas is often the result of other experiences including education or previous jobs. The success of those ideas is often the result of infrastructure or market conditions created outside the firm. In addition to this almost ‘incidental’ reliance on other organisations within the innovation system, the importance of cooperation, coordination and partnerships is increasingly being recognised as being vital to effective innovation.

Examples of collaboration include:

- With other firms to share knowledge, material resources, reduce risks and create new sources of competitive advantage; and
- With research organisations to stay abreast of technological developments and solve technical problems.

As described in Table 6-1, collaboration can vary from informal exchanges via existing networks to contractually binding joint ventures. It generally involves some sharing of resources and jointly undertaking tasks; a sharing of risk that results in all parties being affected if the activities are unsuccessful and if successful mutual benefits are delivered. (DIISR, 2011).
6 Developing a Climate for Innovation

Table 6-1  Approaches to collaboration

<table>
<thead>
<tr>
<th>Approach to collaboration</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Networks</td>
<td>An industry network is a loose grouping of enterprises and other organisations built around information sharing. It can often be a strong precursor to more comprehensive forms of engagement and may be useful as a starting point for the industry engaging. Networks can be built around geography, functions, common problems, supply chains or sub-sectors within the industry.</td>
</tr>
<tr>
<td>Forums</td>
<td>For example an annual innovation forum to identify areas of greatest challenge and to prioritise items for action.</td>
</tr>
<tr>
<td>Partnership or Alliance</td>
<td>A number of enterprises working together to mutually advance common goals.</td>
</tr>
<tr>
<td>Joint venture</td>
<td>When two or more enterprises come together to jointly develop a new enterprise, asset or product.</td>
</tr>
</tbody>
</table>

Figure 6-2 shows the range of alliances and level of formal integration that organisations could consider.

ABS (2010) data shows that regardless of the size of the firm and the type of collaboration undertaken, innovative firms are more active collaborators than non-innovative firms. This data is complemented by OECD analysis showing that collaborating businesses spend 20-50% more on innovation than non-collaborating firms suggesting that collaboration is not a cost saving measure but is used to extend the scope of a project or to complement the firms’ capabilities thereby reducing risks (DIISR, 2011).

Australia ranks poorly compared to other OECD countries in the total proportion of businesses engaging in collaborative innovation. Conversely, our domestic collaboration is high when compared to other OECD countries (DIISR, 2011).
6 Developing a Climate for Innovation

Boxes 6-3 and 6-4 outline examples of both successful and less successful collaboration in the forest industry.

**Box 6-3: Australwood: An example of industry collaboration in the Victorian wood processing industry**

Australwood was founded in 1993 as a consortium of Victorian sawmills with the aim of developing export markets for Victorian hardwood timber products. Australwood worked in collaboration with the Timber Promotion Council of Victoria, particularly in promoting higher feature timbers.

The early years of Australwood focused on market research and educating Victorian sawmillers about international opportunities in the timber industry. The US, Japan and China were identified as markets with significant potential. The US in particular had a very positive response to high feature mixed species products, such as ‘Wormy Chestnut’ flooring. Australwood successfully secured government funding to support its activities, including overseas tours for Victorian sawmillers.

Australwood then moved into a market development phase which involved developing product brands, further development of international market opportunities and identify potential customers. Australwood then became a central marketing point for hardwood exports, whereby all international orders were placed and dispatched through Australwood. Australwood identified which sawmills would fulfil each order, but international customers only had to deal with one contact.

The collaboration of Victorian sawmills under Australwood achieved several key outcomes:

- Successful market research;
- Development of new markets, including identification of customers;
- Consistent product branding;
- Economies of scale - ability to market larger volumes; and
- Centralised marketing.

After a period of time, rather than operating as part of the Australwood consortium, companies started to deal with international customers directly and sawmills started to compete with one another in the export markets. In addition, Australwood tended to favour export markets over domestic markets but grew those export markets to a point where it couldn’t appropriately service and supply them. This eventually led to the winding up of Australwood. This case provides the industry with several opportunities for learning how to work together and manage market-supply capability dynamics.

Source: Alastair Woodard pers. comm.
6 Developing a Climate for Innovation

Box 6-4: Development of a formaldehyde-free adhesive for composite wood products

Dr. Kaichang Li at Oregon State University (OSU) developed a soy-based, formaldehyde-free adhesive for use in composite wood products (Sherman 2007). Inspiration for the invention came from observing how mussels cling to rocks in a marine environment. Further inspiration was the advent of new regulations from the California Environmental Protection Agency’s Air Resources Board (CARB) limiting formaldehyde emissions from composite wood products (CARB 2011). The U.S. Department of Agriculture (USDA) provided funding to conduct research to synthesize an adhesive from soybean protein. When Dr. Li presented this research at a conference, a representative from Columbia Forest Products (CFP, North America’s largest manufacturer of hardwood plywood and veneer) approached him expressing interest in funding further development of the adhesive. Hercules Inc., an adhesive manufacturer, was then brought in as a partner on the project. OSU’s technology transfer office contracted with a legal firm to patent the adhesive and eventually to license the technology to Hercules Inc., who gave exclusive rights for the adhesive’s use to CFP. The adhesive is now in use in all of their hardwood plywood operations in North America.

In summary, this innovation (formaldehyde-free adhesive) involved the following participants and functions:

- **Government:**
  - Federal – USDA provided funding for the invention and the U.S. Patent and Trademark Office registered the patent
  - State of Oregon - Oregon’s state system of higher education funds university faculty to conduct research as well as personnel in OSU’s Technology Transfer office
  - State of California – via the California Environmental Protection Agency, California’s Government in effect served as a key driver in the innovation; the new regulation on formaldehyde emissions was a primary driver for industry demand for ‘green adhesives’.

- **Research organizations** – In 2004, the International Agency for Research on Cancer (part of the World Health Organization), classified formaldehyde as carcinogenic to humans. CARB cites this classification as a driver for regulating formaldehyde emissions from composite wood products (CARB 2011).

- **Private industry** – two private industry firms (Columbia Forest Products and Hercules Inc.) provided funding for development, technical feedback, and materials; a legal firm patented the invention; in addition, firms in Oregon’s forest industry provide funds for research at the university through a tax on harvested timber.

- **Non-profit organizations** – The Forest Products Society (a professional association) organized and hosted the conference where Dr. Li first presented his results; hence, they provided a forum for presentation of the invention as well as networking opportunities.

Source: Leavengood and Bull (2012)

6.4.1 Clusters

Sharing knowledge, skills and experience is more effective when individuals are in the same geographic place. There is therefore merit in exploring options for creating so called ‘clusters’ or regions that are focussed on innovation and the activities that support innovation. Such regions support the education and training of the workforce, research, infrastructure and institutions that facilitate collaboration between business, government, and the independent sector (Collaborative Economics, 2008). Boxes 6-5 and 6-6 provide examples of cluster approaches in the food and manufacturing sectors.
6 Developing a Climate for Innovation

Box 6-5: Geelong Food Co-Products Cluster

The Geelong Food Co-Products Cluster (GFCC) is “a group of like-minded enterprises (and their suppliers and customers) across the Geelong region, working together for mutual commercial benefit.” The GFCC is a “bridge” between regional and business development with local government, regional organisations and businesses all tackling common issues and opportunities that contribute to efficiencies, growth and development.

The development of the GFCC was first initiated in 2005 following a feasibility assessment as part of Regional Development Victoria’s Regional Innovation Clusters Program. That program identified substantial commercial opportunities for food businesses in the seafood, dairy, meat and poultry and game sectors by collaborating to achieve new market penetration, value adding and consolidation benefits from co-products.

The GFCC has provided the collaborative seafood company, Australian Seafood Co-Products Pty Ltd (ASCo), with the resources and facilitation support to enable it to develop a commercial business venture and the successful production and launch of a fertiliser product using the waste generated from fish cleaning and filleting.

Activities that the GFCC supported ASCo with have included:

- Investigation of potential agribusiness and/or manufacturing partners to achieve ASCo Fertilisers’ objectives;
- Field trials to provide agronomic proof of the performance of the fertiliser and conventional alternatives;
- Establishing ASCo Fertilisers as a new company entity in which ASCo Fertilisers and technology partner Biofert are the shareholders; and
- Partnership with the Microbiology and Health Sciences Department at Victoria University to assist with testing and analysis of the fertiliser products.

Negotiations were undertaken with major Australian fertiliser companies to develop a joint-venture relationship to manufacture, brand, distribute and market the biological fertiliser products. A joint venture was established with the company Pivot, for the purpose of:

- Establishing a management structure for ASCo Fertilisers in Geelong as part of the GFCC;
- Engineering a supply chain, for the two staged manufacturing process of the biological fertilisers;
- Construction of manufacturing facilities in Geelong; and
- Commencement of commercial operations.

The success of the ASCo fertiliser product took a decade. The case study is a good example of the positive results that an industry can achieve by industry stakeholders (ASCo) working together and trusting each other in association with an effective cluster intervention model (GFCC).

6 Developing a Climate for Innovation

6.5 Forestry and Innovation

The global forest sector has historically been characterized as being mature and production oriented (Hansen et al., 2007) with little customer focus (Crespell et al., 2006). Research on innovation in the sector has shown the following:

• Forest products managers do not see their companies as particularly innovative but companies have been found to consistently focus on innovation (Crespell et al., 2006);
• The forest industry does not tend to have a systematic approach to new product development (Hansen, 2006); and
• New products developed by the industry are often the result of attempts to utilize readily available raw materials (“resource push products”) rather than from the specific demands in the marketplace (Bull and Ferguson, 2006).

6.5.1 Innovation and the Victorian hardwood processing industry

An opportunity exists for the Victorian hardwood processing industry to both build on the findings of existing reports relevant to the broader forest and manufacturing industries and integrate into its
6 Developing a Climate for Innovation

processes and approach the practical frameworks outlined in this report at both an industry and enterprise level, such actions that will improve both the climate and success of innovation.

6.5.1.1 Relevant findings from other reports

A range of reports and inquiries have been commissioned within the past few years that have findings and recommendations of relevance to the Victorian hardwood processing industry. Each of these reports has elements relating to innovation which are relevant to the Victorian hardwood processing industry as it strives to embrace innovation in a more holistic manner.

**Innovation and Conditions for Innovative Capability in Manufacturing (Forestworks)**

This report outlines some aspects of innovation to increase the understanding of innovation and facilitate further discussion about the topic. Such discussions help to ensure informed comments and contributions to debate and policy development around innovation. The report outlines:

- Innovation drivers;
- Human capital requirements;
- Competencies for innovation; and
- Creating corporate systems that encourage innovation at the workplace.

The report reproduces from Business Skills Australia a useful set of six tools for building workplace innovation in small to medium businesses.

**Pulp and Paper Industry Strategy Group Final Report**

The Pulp and Paper Industry (which forms part of the Victorian hardwood processing industry) is considered by the Group as being at a tipping point, with employment, investment and exports all falling. It recognises the need for prevention of further disinvestment, declining profitability and loss of employment.

The Group outlines the competitive advantages of the industry, many of which it has in common with the broader processing industry.

With these similarities in mind, it is pleasing that the relevant recommendation regarding innovation proposed by this Group correlates well and indeed echoes recommendations proposed in this report: *The establishment of a Pulp and Paper Industry Innovation Council that is appropriately funded to build a culture of innovation in the industry.*

**RD&E strategy for the forest and wood products sector (Forest and Wood Products Australia)**

This report initiates a process of strategy development designed to ensure that RD&E meets the future needs of the forest and wood products sector and the Australian public.

The document provides a view of future RD&E capability requirements in the forest and wood products sector and sets out key actions that need to be taken. It also proposes the establishment of a national-level Forest and Wood Products RD&E Forum to promote cooperation and coordination in the provision of RD&E to the sector and to assist in the alignment of investment in key research priorities. The aim of the forum is that by bringing together key funders, providers and users of RD&E, the Forum will provide a mechanism for reviewing priorities, monitoring capability, and developing common performance measures for effective and efficient RD&E. Representatives of the Victorian hardwood processing industry (e.g. VAFI) should participate within this forum.
6 Developing a Climate for Innovation

Prime Minister’s Manufacturing Taskforce report

This report outlines the opportunities and challenges facing the manufacturing sector. The report provides a roadmap for building a smarter manufacturing sector. The activities proposed during the launch phase of the reform tend to focus on economy wide measures however several of the activities proposed for years one to four in the so-called ‘build’ phase have direct relevance to the Victorian hardwood processing industry. Relevant initiatives that the industry could participate and/or benefit from include:

- The proposed innovation hubs, based on comparative advantages;
- The Smarter Australian Network;
- Growth funding for innovation;
- Design an Innovation Strategy;
- Improved uptake and performance of government business services;
- Smarter workplace initiatives; and
- Australian Leadership Institute.

While a number of recommendations in this report are generally relevant to the Victorian hardwood processing industry and would possibly have a positive impact if they were to be implemented, the following are those considered most relevant to improving the industry’s climate for innovation:

- Recommendation 22: The non-government members of the Taskforce recommend that smaller scale innovation hubs, based on niche specialisations, could be based in major regional centres, and based on existing strengths of these regional centres; and
- Recommendation 24: The non-government members of the Taskforce recommend that a formal and ongoing dialogue should be established between industry and the research and education sector.

Australian Government Inquiry into the Forest Industry – ‘Seeing the forest through the trees’

In 2011, the Standing Committee on Agriculture, Resources, Fisheries and Forestry tabled its report on the Inquiry into the Australian forestry industry – ‘Seeing the forest through the trees.’

The report has a sub-section entitled ‘Innovation’ on the section about Forestry into the future however it focusses on innovation purely from an R&D perspective (as that is what the submissions it received focussed on). Other sections in the report acknowledge the innovations that the industry has implemented to remain competitive. Much of the discussion around innovation is done so by highlighting specific initiatives that have been implemented in the industry rather than the information around the process, culture or climate required to ensure an innovative industry. One submission did note that ‘many of the key elements of an ‘innovation system’ to support the forest products industry were once present in Australia. The same is not true today.’
Opportunities for Innovation in the Victorian Hardwood Processing Industry

7.1 Summary of strategic innovation opportunities

The consultation and research conducted for this project identified a broad range of strategic innovation opportunities for consideration by the Victorian hardwood processing industry. This chapter consolidates these options. Some of the opportunities presented are directly relevant for consideration at the enterprise level while others should be discussed at the industry level. Some are considered relevant for both to consider. The broad list of innovation opportunities is complemented with a list of factors that the Victorian hardwood processing industry should consider before deciding which innovation pathways to progress further.

The Chapter concludes with three recommendations each for the industry and individual enterprises within the Victorian hardwood processing industry.

The strategic innovation opportunities set out in this Chapter are based on the following timeframes and priority rankings:

**Timeframe:**
- Short (S): 1-5 years
- Medium (M): 5-10 years
- Long (L): 10 years plus

**Priority:**
- Low: For consideration by the business or industry but is not considered an urgent imperative to act upon
- Medium: For immediate consideration by business or industry with a response as to whether action is required
- High: For immediate consideration
7 Opportunities for Innovation in the Victorian Hardwood Processing Industry

7.1.1 Resource-related opportunities

Table 7-1 outlines key opportunities identified as a result of the Section 3 analysis of the Victorian hardwood forest resource. The analysis identified a range of factors include log volume and quality that are likely to result in ongoing challenges to traditional processing. In addition the analysis highlighted opportunities available from taking further advantage of the range of species available from hardwood forests and their inherent durability, strength and appearance characteristics.

<table>
<thead>
<tr>
<th>Industry or Enterprise</th>
<th>Opportunities</th>
<th>Timeframe</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>I and E</td>
<td>There is a need to identify innovative products and processes to deal with the higher incidence of gum vein within the ash resource</td>
<td>S</td>
<td>H</td>
</tr>
<tr>
<td>I</td>
<td>Opportunities to improve log allocation/merchandising processes, particularly for C grade ash logs, to ensure that logs are sent to mills that can maximise the value of sawn timber products produced from these logs</td>
<td>S</td>
<td>H</td>
</tr>
<tr>
<td>I</td>
<td>Investigate the feasibility of some changes to the VicForests grade specifications for C grade ash logs</td>
<td>S</td>
<td>M</td>
</tr>
<tr>
<td>I and E</td>
<td>Identify new markets and increase utilisation of mixed species sawlogs in Central Highlands</td>
<td>S</td>
<td>H</td>
</tr>
<tr>
<td>I</td>
<td>Identify potential new processing options and markets for the residual resource across the Working Forest Area</td>
<td>S</td>
<td>H</td>
</tr>
<tr>
<td>I and E</td>
<td>Develop an investment memorandum to attract investors for processing the residual forest resource across the Working Forest Area</td>
<td>S</td>
<td>M</td>
</tr>
<tr>
<td>I</td>
<td>Research the suitability of different species within the mixed species resource for different processing applications</td>
<td>S</td>
<td>M</td>
</tr>
<tr>
<td>I</td>
<td>Investment is required to better understand the spatial extent and productive potential of the private native forest resource</td>
<td>S</td>
<td>M</td>
</tr>
<tr>
<td>I</td>
<td>Extension is required to assist private landowners in managing and marketing their resources, and meeting regulatory requirements</td>
<td>S-M</td>
<td>M</td>
</tr>
<tr>
<td>I and E</td>
<td>Consider options for industry to process the currently unutilised public native forest near Tumbarumba NSW, to supplement Victorian hardwood log supply</td>
<td>M-L</td>
<td>M</td>
</tr>
</tbody>
</table>
7 Opportunities for Innovation in the Victorian Hardwood Processing Industry

7.1.2 Market-related opportunities

Table 7-2 outlines key opportunities identified as a result of the Chapter 4 analysis of the available hardwood markets and emerging product trends and opportunities. The analysis identified opportunities in existing markets for the hardwood processing industry to promote growth, both in terms of their own operations but also in terms of the products they produce and the markets they supply. A number of emerging product opportunities were also assessed where either existing processors or new investors may seek new, potentially revolutionary markets for the hardwood resource.

<table>
<thead>
<tr>
<th>Industry or Enterprise</th>
<th>Opportunities</th>
<th>Timeframe</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>I and E</td>
<td>Explore opportunities for capitalising further upon the durability and aesthetic appeal of Victorian hardwoods</td>
<td>M-L</td>
<td>H</td>
</tr>
<tr>
<td>I</td>
<td>Explore options for further capitalising and marketing the sustainable, legal and ‘eco-friendly’ characteristics of Victorian hardwood products, particularly with end customers</td>
<td>M-L</td>
<td>H</td>
</tr>
<tr>
<td>Sawn timber</td>
<td>Explore options to maintain competitiveness in flooring and decking timber, through using lower cost materials and production processes to enable a more compelling product offering e.g. engineered flooring</td>
<td>S-M</td>
<td>H</td>
</tr>
<tr>
<td>E</td>
<td>Explore options for supplying greater volumes into the decking and privacy screen markets through either durable mixed species timber or potentially H3 treated ash timber</td>
<td>S-M</td>
<td>H</td>
</tr>
<tr>
<td>I and E</td>
<td>Investigate the development of fit for purpose structural systems such as frame and truss and sub-flooring systems that can be made to order as a value added secondary product</td>
<td>S-M</td>
<td>M</td>
</tr>
<tr>
<td>I and E</td>
<td>Explore the range of ‘product improvement’ innovations that could be made to existing products including standardising flooring dimension specifications and taking advantage of technological developments such as powder coating</td>
<td>S</td>
<td>H</td>
</tr>
<tr>
<td>I</td>
<td>Consider standardising the dimensions of solid timber flooring products to improve the substitutability of the industry’s product offering, particularly given the relatively limited availability of mixed species</td>
<td>S-M</td>
<td>M</td>
</tr>
<tr>
<td>Furniture</td>
<td>Improve the recognition and, ideally the demand for, Australian timber furniture amongst Australian consumers</td>
<td>S-M</td>
<td>M</td>
</tr>
<tr>
<td>I and E</td>
<td>Explore opportunities for niche, high grade, specific furniture products that are based on local production and a strong relationship between designer and manufacturer</td>
<td>S-M</td>
<td>M</td>
</tr>
</tbody>
</table>
## 7 Opportunities for Innovation in the Victorian Hardwood Processing Industry

<table>
<thead>
<tr>
<th>Industry or Enterprise</th>
<th>Opportunities</th>
<th>Timeframe</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>I and E</td>
<td>Explore opportunities for capitalising further upon the durability and aesthetic appeal of Victorian hardwoods</td>
<td>M-L</td>
<td>H</td>
</tr>
<tr>
<td>I</td>
<td>Explore options for further capitalising and marketing the sustainable, legal and ‘eco-friendly’ characteristics of Victorian hardwood products, particularly with end customers</td>
<td>M-L</td>
<td>H</td>
</tr>
<tr>
<td>I and E</td>
<td>Explore opportunities within the production process of value added products, for outsourcing elements of the production process</td>
<td>S-M</td>
<td>M</td>
</tr>
<tr>
<td><strong>Joinery and mouldings</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I and E</td>
<td>Assess the potential for re-allocating structural grade product into higher value markets using innovative processing and/or marketing approaches</td>
<td>S</td>
<td>H</td>
</tr>
<tr>
<td>I and E</td>
<td>Explore opportunities for creating market demand for locally made, high quality, specifically designed joinery, mouldings, windows and doors</td>
<td>S-M</td>
<td>M</td>
</tr>
<tr>
<td>I and E</td>
<td>Explore opportunities for additional pre-fabricated product options e.g. stairs</td>
<td>M</td>
<td>M</td>
</tr>
<tr>
<td><strong>Pulp and paper</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>Explore opportunities to expand Maryvale mill</td>
<td>S-M</td>
<td>M</td>
</tr>
<tr>
<td>E</td>
<td>Explore opportunities for investment in productivity improvements or further improvements to environmental performance and community engagement</td>
<td>S-M</td>
<td>M</td>
</tr>
<tr>
<td>I and E</td>
<td>Explore opportunities for improved branding of paper products produced from Australian forests to demonstrate and reinforce the product’s environmental credentials relative to competitors</td>
<td>S-M</td>
<td>M</td>
</tr>
<tr>
<td><strong>Woodchip exports</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>Enterprises involved in the export of woodchips could explore opportunities to increase their export volumes to China</td>
<td>S-M</td>
<td>M</td>
</tr>
<tr>
<td><strong>New or emerging hardwood markets</strong></td>
<td>The industry could consider conducting a feasibility study to further assess the suitability of producing engineered strand lumber, cross laminated timber and plywood and veneer (or other products) from Victorian hardwood logs (native and plantation). Depending on the outcome of the study, the industry could assess whether it invests in any necessary research that would be required to develop these products from Victorian hardwoods and/or the appropriateness of the development of an investment memorandum to try and attract investment interest in the building of such a facility in Victoria</td>
<td>Feasibility report: S-M Research and investment memorandum: M</td>
<td>H</td>
</tr>
<tr>
<td><strong>Bioenergy</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>Explore opportunities for generating electricity from woody biomass</td>
<td>S</td>
<td>M</td>
</tr>
</tbody>
</table>
### 7 Opportunities for Innovation in the Victorian Hardwood Processing Industry

<table>
<thead>
<tr>
<th>Industry or Enterprise</th>
<th>Opportunities</th>
<th>Timeframe</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>I and E</td>
<td>Explore opportunities for capitalising further upon the durability and aesthetic appeal of Victorian hardwoods</td>
<td>M-L</td>
<td>H</td>
</tr>
<tr>
<td>I</td>
<td>Explore options for further capitalising and marketing the sustainable, legal and ‘eco-friendly’ characteristics of Victorian hardwood products, particularly with end customers</td>
<td>M-L</td>
<td>H</td>
</tr>
<tr>
<td>I</td>
<td>Continue to lobby government for recognition of bioenergy produced from native forest residues within the RET legislation</td>
<td>S</td>
<td>H</td>
</tr>
<tr>
<td>E</td>
<td>Explore opportunities for producing wood pellets from native forest residues for export until such time as there is more favourable policy in Australia</td>
<td>S-M</td>
<td>M</td>
</tr>
<tr>
<td>I and E</td>
<td>Continue to keep abreast of, and participate in, research focussed on producing biofuels from forest products</td>
<td>S-M</td>
<td>M</td>
</tr>
</tbody>
</table>
7 Opportunities for Innovation in the Victorian Hardwood Processing Industry

7.1.3 Processing and competitiveness-related opportunities

Table 7-3 outlines key opportunities identified as a result of the Chapter 5 analysis of the industry’s supply chain and competitive environment. The analysis identified potentially more efficient approaches to supplying hardwood markets by shortening the supply chain where possible and engaging more closely and being more responsive to the needs of end-consumers. A number of strategies to improve competitiveness were also identified based on new or expanded processing technologies, supplying markets or organising operations in alternative ways.

Table 7-3 Processing and competitiveness related strategic innovation opportunities

<table>
<thead>
<tr>
<th>Industry or Enterprise</th>
<th>Opportunities</th>
<th>Timeframe</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Supply chain opportunities</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>As a result of changes in the timber retailing sector there are opportunities to increase the percentage of hardwood timber products that are sold directly to end users</td>
<td>S</td>
<td>H</td>
</tr>
<tr>
<td>I and E</td>
<td>Consider outsourcing/offshoring elements of the production process</td>
<td>S-M</td>
<td>M</td>
</tr>
<tr>
<td><strong>Processing competitiveness opportunities</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>Improved capacity to process plantation resources could be developed through either a new sawmill or retrofit of existing sawmills</td>
<td>M</td>
<td>M</td>
</tr>
<tr>
<td>I and E</td>
<td>Consider options for consolidating disparate sawmilling operations and re-investing in processing efficiency</td>
<td>S-M</td>
<td>H</td>
</tr>
<tr>
<td>E</td>
<td>With the exception of processors producing niche products, enterprises should consider increasing scale to improve profitability</td>
<td>S-M</td>
<td>H</td>
</tr>
<tr>
<td>E</td>
<td>Consider options for automating the production process through the introduction of technologies such as scanners and stackers</td>
<td>S</td>
<td>M</td>
</tr>
<tr>
<td>I and E</td>
<td>Consideration of the development of ‘processing hubs’ (i.e. clusters) particularly for high, grade niche products</td>
<td>S</td>
<td>H</td>
</tr>
</tbody>
</table>
7 Opportunities for Innovation in the Victorian Hardwood Processing Industry

7.1.4 Opportunities for developing a climate for innovation

Table 7-4 outlines key opportunities identified as a result of the Chapter 6 discussion and analysis of ways that Victorian hardwood processing industry can better foster a climate for innovation. The analysis outlined a framework for the industry to utilise for developing innovations, enterprise level approaches for fostering innovation within enterprises, the role of education and skills development, the role and value of collaboration and how the forestry industry has embraced innovation to date.

<table>
<thead>
<tr>
<th>Industry or Enterprise</th>
<th>Opportunities</th>
<th>Timeframe</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Integrate an innovation framework utilising the elements of expertise, interaction, diversity and application into an industry wide co-ordinated approach to innovation</td>
<td>S</td>
<td>H</td>
</tr>
<tr>
<td>E</td>
<td>Embrace the documented business level cultural factors that foster creativity and innovation</td>
<td>S</td>
<td>H</td>
</tr>
<tr>
<td>E</td>
<td>Consider whether the enterprise utilises the documented critical positional factors. Where appropriate integrate guidelines developed by Roos (2011) into the enterprise’s approach to business</td>
<td>S</td>
<td>H</td>
</tr>
<tr>
<td>I</td>
<td>Led by Forestworks and supported by the training institutions, confirm and/or develop workforce planning and development initiatives that ensure that the industry is supported by employees with the necessary technical and management skills, complemented by a comprehensive understanding of innovation</td>
<td>S</td>
<td>H</td>
</tr>
<tr>
<td>I</td>
<td>Consider the range of opportunities that exist for the industry to integrate a more collaborative approach into the way it carries out its business</td>
<td>S-M</td>
<td>H</td>
</tr>
<tr>
<td>I</td>
<td>Consider the development of industry clusters e.g. for the development of a mixed species niche product development in the Central Highlands region</td>
<td>M</td>
<td>M</td>
</tr>
<tr>
<td>I</td>
<td>Consider the findings of other recent relevant reports that complement and/or build on this report and integrate into an industry wide coordinated approach to innovation</td>
<td>S</td>
<td>M</td>
</tr>
</tbody>
</table>
7 Opportunities for Innovation in the Victorian Hardwood Processing Industry

7.1.5 Managing innovation risk factors

A large range of factors exist that may impact the ability of the Victorian hardwood industry to be able to realise its innovative potential. Table 7-5 summarises factors relating to the technology, investment, policy, management and personnel that the industry should address if they choose to implement any of the innovative options outlined in this report.

<table>
<thead>
<tr>
<th>Category of influence</th>
<th>Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technology</td>
<td>Access to knowledge about technologies that may enable enterprises to improve their processes</td>
</tr>
<tr>
<td>Investment</td>
<td>Access to adequate capital, at an appropriate interest rate, to enable adoption of new processing technologies</td>
</tr>
<tr>
<td></td>
<td>Access to adequate funding sources to research and address elements that may inhibit the ability for a technology to be adopted</td>
</tr>
<tr>
<td>Policy</td>
<td>Surety of resource to justify investment in innovation</td>
</tr>
<tr>
<td></td>
<td>Adequate capital to support campaigns (e.g. FWPA’s Wood Naturally Better campaign) that aim to improve the support and ‘social licence’ for products made from Australian forest products</td>
</tr>
<tr>
<td></td>
<td>Policy that supports the production of bioenergy from native forest residues</td>
</tr>
<tr>
<td>Management, leadership</td>
<td>Capacity to understand the technology that is being considered for implementation</td>
</tr>
<tr>
<td>and personnel</td>
<td>Appropriate process/es for identifying, assessing and implementing new product, process or business systems innovations</td>
</tr>
<tr>
<td></td>
<td>Responsible business practices that encourage community support and the support of the broader public</td>
</tr>
<tr>
<td></td>
<td>A culture that enable ideas for innovation within the enterprise to be openly shared, assessed and implemented</td>
</tr>
<tr>
<td></td>
<td>Leaders that are committed to developing a climate for innovation across the industry</td>
</tr>
</tbody>
</table>
7 Opportunities for Innovation in the Victorian Hardwood Processing Industry

<table>
<thead>
<tr>
<th>Category of influence</th>
<th>Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A culture that is open to managing and processing the resource differently to how it has in the past, including outsourcing parts of the production process</td>
</tr>
<tr>
<td></td>
<td>Where investment in new processing technologies are made, enterprises will need to train their workforce in the skills required to proficiently utilise and manage them</td>
</tr>
<tr>
<td></td>
<td>People in managerial positions that understand, or have the capacity to understand alternative approaches to production, e.g. making high end, fit-for purpose products that utilise a strong relationship between designers and manufacturer</td>
</tr>
<tr>
<td></td>
<td>Staff that understand the economics of the processing so as to appropriately manage any decisions around outsourcing/offshoring</td>
</tr>
<tr>
<td></td>
<td>Strong and effective relationships should exist across the supply chain, e.g. between forest manager and processor or processor and designer to allow for more sophisticated solutions to problems to be developed</td>
</tr>
<tr>
<td></td>
<td>Effective succession plans</td>
</tr>
</tbody>
</table>
7 Opportunities for Innovation in the Victorian Hardwood Processing Industry

7.2 A blueprint for innovation in the Victorian Hardwood Processing Industry

The following section concludes this chapter and report. It provides three succinct and overarching recommendations for the Victorian hardwood processing industry and three recommendations for enterprises to consider respectively.

The recommendations that are provided are designed to deliver innovation pathways that will help ensure that the industry:

- Improves its understanding of, and climate for, successful innovation;
- Has the opportunity to embrace sustainable approaches to identify, analyse and implement innovation thereby improving its competitive position;
- Can take advantage of programs and grants that can assist the industry to implement the innovation options highlighted in this report;
- Has long term community acceptance and government support; and
- Optimises the opportunities that working collaboratively can offer.

7.2.1 Recommendations for the Victorian hardwood processing industry

1. Develop an industry wide co-ordinated approach to innovation. As part of this approach, commit to exploring between one to three innovation options for the industry in the short term.

The Victorian hardwood processing industry would benefit from developing a co-ordinated approach to innovative action which would aim to:

- Increase the understanding of, and climate for, innovation within the industry;
- Develop a structured and successful approach to innovation management;
- Identify current and potential sources of ideas for innovation utilising a disciplined, collaborative process involving a range of participants such as local industry, scientific and technical experts both familiar and unfamiliar to the industry and people from the forest products industry from outside either Victoria or Australia. Sources of ideas should incorporate relevant actions identified by this and relevant previous reports and inquiries undertaken for the forest industry;
- Utilise innovative frameworks that are known to assist with the successful development and implementation of innovation (e.g. as outlined in Section 6.2);
- Develop action plans for the development and implementation of innovations; and
- Provide ongoing opportunities for networking opportunities for the industry to continue to identify a range of innovation options.

Box 7.1 outlines a pathway for implementing an industry wide co-ordinated approach to innovation.
7 Opportunities for Innovation in the Victorian Hardwood Processing Industry

Box 7-1: Pathway for developing a coordinated approach to innovation

<table>
<thead>
<tr>
<th>Step</th>
<th>Detail</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Promote the role and develop understanding of innovation in the Victorian hardwood processing industry</td>
<td>Consider who should take responsibility for this role and whether it is carried out by an individual or several people.</td>
</tr>
<tr>
<td>2. Consider establishing a partnership intermediary organisation (potentially public-private) to manage the development and implementation of innovation within the industry</td>
<td>This (and steps 4 and 6) builds on the need to develop a structured and successful implementation process for innovation</td>
</tr>
<tr>
<td>3. Identify current and potential sources of ideas for innovation utilising a disciplined, collaborative process involving: a. Local industry b. Scientific and technical experts both familiar and unfamiliar to the industry c. People from the forest products industry from outside either the state or Australia</td>
<td>This step builds upon the concepts outlined in Section 6.2 and Figure 6-1 which helps to ensure that the industry has a multi-pronged approach to the innovation process incorporating: • Expertise • Interaction • Diversity • Application</td>
</tr>
<tr>
<td>4. Develop action plans for implementing collaborative innovation</td>
<td>Details of the action plan might include identified measureable outcomes, identification of roles and relationships, development of agreements, setting accountabilities and establishing a supportive architecture or network for the development and implementation of the innovation</td>
</tr>
<tr>
<td>5. Continue to network and provide opportunity for identifying options for innovation in the industry</td>
<td>Through, for example, regular innovation forums</td>
</tr>
<tr>
<td>6. Review the success of the innovation initiatives</td>
<td>Learn from what has worked well and what elements of the process require improvements</td>
</tr>
</tbody>
</table>

2. *Strengthen the industry’s social licence to operate*

The long term success of the industry requires the support of the community, and the Government, to ensure that it can both operate in the short term, and provide surety of access to resource in the long term. The industry will only be able to make significant investments into improving its productivity and product offerings if it enjoys such community and political support.

Industry needs to support efforts to improve their social licence to operate by conducting both responsible business practices, working with their suppliers and their customers, and providing support to enable industry associations (e.g. VAFI, AFPA, FWPA), to lobby on their behalf and maintain programs such as the ‘Wood Naturally Better’ campaign.

3. *Identify opportunities for improving the climate for innovation within the hardwood processing industry*

The work carried out for the this report has identified that while there is an appetite for innovation and potentially doing things differently (i.e. working more collaboratively), there is a great need to both improve the understanding of, and climate for, innovation in the industry. Industry representatives (e.g. VAFI, FWPA) should take responsibility to discuss with relevant agencies and organisations, such as the Victorian Department of Business Innovation and Enterprise Connect, the range of relevant services that they offer. In the case of Enterprise Connect examples include the ‘Researcher in
7 Opportunities for Innovation in the Victorian Hardwood Processing Industry

Business’ program and understanding the role it played in the development of the Geelong Food Co-Operative Cluster. In the case of the Department of Business Innovation it would include its understanding of broader government grant programs (e.g. Business Victoria’s Manufacturing Productivity Network Grants).

7.2.2 Recommendations for enterprises

1. **Undertake a business review**

This report has identified a large range of options for enterprises to consider for improving their competitiveness. It is pertinent as part of any process to improve a business’s competitive position that due consideration is given to the fundamentals of business management such as strategy, human resources, financial management and marketing. If it has not already occurred, prior to making large scale changes to their business, managers should undertake a business review (ideally utilising somebody external to the business) to identify opportunities for improvement. One approach to doing this may be to engage with Enterprise Connect. Enterprise Connect offers a free business advisory service that provides recommendations on strategy, human resources, financial management, business and production processes and marketing.

2. **Participate in the industry’s co-ordinated approach to innovation**

Building on the momentum developed around innovation as a result of both this report and other current industry initiatives, there is an opportunity to build a sustainable approach to identifying, analysing and implementing innovation within the industry. Enterprises should take part in any co-ordinated approaches that are developed (See Box 7-1). This will not only serve to assist with improving the competitiveness of the industry as a whole but will improve an enterprise’s understanding of innovation, offer important networking opportunities and deliver ideas for innovation that may be applicable at both the enterprise and/or industry level.

3. **Develop a structured approach to identifying, analysing and implementing innovation (product, process or business) within the enterprise**

This report has identified a wide range of innovations that enterprises within the Victorian hardwood processing industry can consider adopting. The most appropriate way for an enterprise to assess ideas for innovation is to have an effective ‘idea system’ complemented by a structured approach to identifying, analysing and implementing innovation. Box 7-2 outlines the elements of an effective idea system as well as the ‘Stage Gate System’ for moving new product ideas to launch via a series of activities (stages) and decision points (gates). While this process was developed for product innovations, there is no reason why the general approach and principles could not be applied to both process and business systems innovations.
Box 7-2: Pathway for developing an idea system and product development process

An effective enterprise level idea system
• Ideas are encouraged and welcomed;
• Submitting ideas is simple;
• Evaluation of ideas is quick and effective;
• Feedback is timely, constructive and informative;
• Implementation is rapid and smooth;
• Ideas are reviewed for additional potential;
• People are recognised, and success celebrated; and
• Idea system performance is measured, reviewed and improved.
Source: Robinson and Schroeder (2006)

Stage-Gate product development process

<table>
<thead>
<tr>
<th>Stage</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage 0 – Discovery</td>
<td>Activities designed to discover opportunities and to generate new product ideas.</td>
</tr>
<tr>
<td>Stage 1 – Scoping</td>
<td>A quick and inexpensive assessment of the technical merits of the project and its market prospects.</td>
</tr>
<tr>
<td>Stage 2 – Build Business Case</td>
<td>This is the critical stage – the one that makes or breaks the project. Technical, marketing and business feasibility are accessed resulting in a business case which has three main components – product and project definition, project justification and project plan.</td>
</tr>
<tr>
<td>Stage 3 – Development</td>
<td>Plans are translated into concrete deliverables. The actual design and development of the new product occurs, the manufacturing or operations plan is mapped out, the marketing launch and operating plans are developed, and the test plans for the next stage are defined.</td>
</tr>
<tr>
<td>Stage 4 – Testing and validation</td>
<td>The purpose of this stage is to provide validation of the entire project: the product itself, the production/manufacturing process, customer acceptance, and the economics of the project.</td>
</tr>
<tr>
<td>Stage 5 - Launch</td>
<td>Commercialisation of the product – the beginning of full production and commercial launch.</td>
</tr>
</tbody>
</table>

Source: The Product Development Institute www.prod-dev.com/stage-gate.php
References


Bioenergy Australia (2010) *Bioenergy Opportunities in Australia*. Presentation by Dr. Stephen Schuck to the Australia-India Energy and Minerals Forum Perth 8 June 2010
8 References


CEC (2008) *Australian Bioenergy Roadmap*. CEC Australia


Department of Innovation, Industry, Science and Research (2012). *Smarter manufacturing for a smarter Australia*. Prime Minister’s Taskforce on Manufacturing, Department of Innovation, Industry, Science and Research, Canberra


8 References


Forest and Wood Products Australia. 2010. National primary industries research, development and extension framework, RD&E strategy for the forest and wood products sector


Pew Center on the States and National Governors Association. (undated) Innovation America; Investing in Innovation


8 References


RISI (2007). *Wood Resource Quarterly*. RISI, Boston, USA


Limitations

URS Australia Pty Ltd (URS) has prepared this report in accordance with the usual care and thoroughness of the consulting profession for the use of the Victorian Association of Forest Industries and only those third parties who have been authorised in writing by URS to rely on this Report.

It is based on generally accepted practices and standards at the time it was prepared. No other warranty, expressed or implied, is made as to the professional advice included in this Report.

It is prepared in accordance with the scope of work and for the purpose outlined in the contract dated 27 June 2012.

Where this Report indicates that information has been provided to URS by third parties, URS has made no independent verification of this information except as expressly stated in the Report. URS assumes no liability for any inaccuracies in or omissions to that information.

This Report was prepared between 27 June 2012 and 2 November 2012 and is based on the conditions encountered and information reviewed at the time of preparation. URS disclaims responsibility for any changes that may have occurred after this time.

This Report should be read in full. No responsibility is accepted for use of any part of this report in any other context or for any other purpose or by third parties. This Report does not purport to give legal advice. Legal advice can only be given by qualified legal practitioners.

Except as required by law, no third party may use or rely on this Report unless otherwise agreed by URS in writing. Where such agreement is provided, URS will provide a letter of reliance to the agreed third party in the form required by URS.

To the extent permitted by law, URS expressly disclaims and excludes liability for any loss, damage, cost or expenses suffered by any third party relating to or resulting from the use of, or reliance on, any information contained in this Report. URS does not admit that any action, liability or claim may exist or be available to any third party.

Except as specifically stated in this section, URS does not authorise the use of this Report by any third party.

It is the responsibility of third parties to independently make inquiries or seek advice in relation to their particular requirements and proposed use of the site.

Any estimates of potential costs which have been provided are presented as estimates only as at the date of the Report. Any cost estimates that have been provided may therefore vary from actual costs at the time of expenditure.