Industry Development Opportunities for the Southern NSW Forest Industry to 2010 and 2020

A report undertaken for the NSW CRA/RFA Steering Committee

October 1997

INDUSTRY DEVELOPMENT OPPORTUNITIES FOR THE SOUTHERN NSW FOREST INDUSTRY TO 2010 AND 2020

MARGULES POYRY PTY LTD

A report undertaken for the NSW CRA/RFA Steering Committee
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Report Status

This report has been prepared as a working paper for the NSW CRA/RFA Steering Committee under the direction of the Economic and Social Technical Committee. It is recognised that it may contain errors that require correction but it is released to be consistent with the principle that information related to the comprehensive regional assessment process in New South Wales will be made publicly available.

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This project has been jointly funded by the New South Wales and Commonwealth Governments. The work undertaken within this project has been managed by the joint NSW / Commonwealth CRA/RFA Steering Committee which includes representatives from the NSW and Commonwealth Governments and stakeholder groups.

The project has been overseen and the methodology has been developed through the Economic and Social Technical Committee which includes representatives from the NSW and Commonwealth Governments and stakeholder groups.

Industry development options for the southern NSW forest industry to 2010 and 2020

October 1997

Prepared for

ABARE

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Table of Contents

Page No.

Figures

Page No.

Tables

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MARGULES PÖYRY PTY LTD

Rob de Fégely
MANAGING DIRECTOR

February

Glossary

ABARE	Australian Bureau of Agricultural and Resource Economics
ADt	air dry tonnes
BDt	bone dry tonnes
BHKP	bleached hardwood kraft pulp (or bleached hardwood market pulp)
BKP	bleached kraft pulp
BSKP	bleached softwood kraft pulp
CRA	Comprehensive Regional Assessment
FPA	NSW Forest Products Association
Hardwood	all wood from trees classified botanically as *Angiospermae* (flowering plants usually with broad leaves)
HB	hardboard
HWC	heavyweight coated paper
IAP	Interim Assessment Process
LVL	laminated veneer lumber
LWC	lightweight coated paper
MDF	medium density fibreboard
MWC	medium weight coated paper
OSB	oriented strand board
PB	particleboard
PGW	pressurised groundwood pulp
RCP	recovered paper
RFA	Regional Forest Agreement
ROI	return on investment
SC	super-calendered paper
SFNSW	State Forests of New South Wales
Softwood	All wood from trees classified as *Gymnospermae* (cone-bearing trees)
TEF	totally effluent free
TMP	thermo-mechanical pulp
Woodfree pulp/paper	chemically produced pulp/paper

Definitions

Paper and paperboard are divided into the following main groups:

- newsprint
- printing and writing papers
- tissue
- industrial grades.

Papermaking pulps are divided into the following main groups:

- Mechanical pulp
- Semi-chemical pulp
- Chemical pulp (including bleached sulphate, unbleached sulphate, bleached sulphite and unbleached sulphite)
- Recovered paper refers to unprocessed scrap paper (*before* processing losses)
- Recycled fibre (pulp) refers to processed scrap paper (*after* processing losses).

Dissolving pulp is not a papermaking fibre, but used for textiles such as rayon.

Pulpwood in this report includes both roundwood and chips used by the pulp, paper and reconstituted wood industries.

Wood-based panels are divided into two groups:

- Solid wood, plywood and veneer
- Reconstituted other wood-based panels (all kinds of particleboard and fibreboard).

Net trade is defined as the value of exports - imports.

Backsawing - technique for sawing timber that is often used for exposing feature in attractive timber species.

Summary

PREAMBLE

The Australian Bureau of Agricultural and Resource Economics (ABARE) and the Economic and Social Technical Committee have engaged Margules Pöyry Pty Ltd (Margules) to identify industry development options for southern NSW illustrated by long term scenarios to 2010 and 2020. The study region is defined as the South CRA and Eden CRA regions. These will be collectively referred to in the report as the southern NSW RFA region.

The background to this study is the inquiry into areas to be reserved under the New South Wales/Commonwealth Regional Forest Agreement, otherwise known as the RFA process. As part of a Comprehensive Regional Assessment (CRA), the value of economic and industry development is to be assessed. Given certain predictions on resource availability and technological advances in processing forest products, it is possible to construct long term scenarios for the forest industry in the region to 2010 and 2020. Importantly, this industry must not only be technically efficient and competitive, but it must also have a solid market base. Hence, the market for potential forest products has also been reviewed.

OBJECTIVE OF THE STUDY

The core objective of this study is to project the potential development of a technically feasible and world competitive forest industry in the region in the long term perspective to 2020. Snapshots of resource availability and industry development have been taken for 2010 and 2020.

FOREST RESOURCES

Resource assessment and forecasts of development include hardwood and softwood sourced from native forests and plantations owned by both public and private growers. Due to the current state of flux regarding the Interim Assessment Process in NSW, two hardwood resource scenarios have been illustrated for native forest. These are based on published data ex the RACAC Draft Interim Forestry Assessment Report. It is important to note that the resource outcomes illustrated represent a range of volume of wood potentially available to industry and do not predicate the eventual outcomes of the RFA process in NSW.

ASSUMPTIONS (FOREST RESOURCE)

A number of assumptions have been made regarding the resource to simplify the overall resource picture. These are detailed in Section 2.4.

Hardwood

The hardwood resource has been characterised by 3 main areas of supply: Tablelands, Coastal and Tumut/Tumbarumba. Resource potentially available to industry has been quantified at “maximum” and “minimum” woodflow levels. The former represents a “maximum” and the latter a “minimum” woodflow as represented under the Interim Assessment Process and as expressed in the RACAC Draft Interim Forestry Assessment Report, June 1996.

It is important to note that these levels of woodflow are illustrative ranges of supply potentially available to industry. The outcome of the RFA process with respect to hardwood availability to industry in southern NSW may be significantly different from scenarios illustrated here.

The current actual and the estimated roundwood supply from the region's forests is shown in the following tables:

Hardwood resource potentially available under a "maximum woodflow" scenario

Sawlog (000 m^3)	Current harvest	Current potential	Potential2010	Potential2020
Tumut/Tumbarumba	57.0	60.1	58.9	57.9
Tablelands	26.8	22.0	20.4	21.2
Coastal	91.3	103.8	100.5	96.4
TOTAL	***175.1***	***185.9***	***179.8***	***175.5***

Pulpwood (000 m^3)	Current harvest	Current potential	Potential2010	Potential2020
Tumut/Tumbarumba	22.8	40.0	39.6	39.2
Tablelands	23.6	31.1	37.8	72.8
Coastal	463.9	605.2	763.0	830.0
TOTAL	***510.3***	***676.3***	***840.3***	***942.0***

Roundwood products (000 m^3)	Current harvest	Current potential	Potential2010	Potential2020
Tumut/Tumbarumba	0	0	0	0
Tablelands	0	0	0	0
Coastal	0.8	3.5	7.0	7.0
TOTAL	***0.8***	***3.5***	***7.0***	***7.0***

Hardwood resource potentially available under a "minimum woodflow" scenario

Sawlog (000 m^3)	Current harvest	Current potential	Potential2010	Potential2020
Tumut/Tumbarumba	57.0	57.5	56.3	55.3
Tablelands	26.8	19.8	18.2	17.0
Coastal	91.3	79.3	76.0	72.9
TOTAL	***175.1***	***156.6***	***150.5***	***145.2***

Pulpwood (000 m^3)	Current harvest	Current potential	Potential2010	Potential2020
Tumut/Tumbarumba	22.8	39.0	38.5	38.1
Tablelands	23.6	23.7	28.3	48.9
Coastal	463.9	457.6	572.9	615.0
TOTAL	***510.3***	***520.3***	***639.7***	***702.0***

Roundwood products (000 m^3)	Current harvest	Current potential	Potential2010	Potential2020
Tumut/Tumbarumba	0	0	0	0
Tablelands	0	0	0	0
Coastal	0.8	3.5	4.2	4.2
TOTAL	***0.8***	***3.5***	***4.2***	***4.2***

Softwood

The resource is characterised by four predominant areas of supply: Queanbeyan/ACT, Moss Vale, Bombala, and Tumut/Tumbarumba. Predicted woodflow from existing and planned plantation development in each of these areas has been quantified by product.

Although the plantations in the Oberon area are technically part of the southern NSW RFA region, they have not been addressed in any detail in this report because:

1. They do not fit with the other parts of the study region due to their geographic separation.

2. They are part of the Central Tablelands softwood resource which covers the Oberon, Lithgow, Bathurst and Orange areas.

3. Wood flows from the Central Tablelands to the southern NSW RFA region have been very small and infrequent and are likely to remain so.

4. The resource in this area will not impact on other developments in the southern NSW RFA region.

Softwood resource potentially available - southern NSW

Sawlog (000 m^3)	Current harvest	Current potential	Potential2010	Potential2020
Bombala	50	290	380	550
Queanbeyan/ACT	141	136	152	172
Moss Vale	30	40	40	40
Tumut/Tumbarumba	622	692	1,210	1,325
TOTAL	***843***	***1,158***	***1,782***	***2,087***

	CURRENT HARVEST		CURRENT POTENTIAL		POTENTIAL 2010		POTENTIAL 2020	
Pulpwood (000 m^3)	**Roundwood**	**Residue**	**Roundwood**	**Residue**	**Roundwood**	**Residue**	**Roundwood**	**Residue**
Bombala	35	0	200	87	270	114	270	165
Queanbeyan/ACT	0	0	35	40.8	35	45.6	35	51.6
Moss Vale	12	0	12	12	12	12	12	12
Tumut/Tumbarumba	235	205	785	220	825	518	795	571.5
TOTAL	***282***	***205***	***1,032***	***359.8***	***1,142***	***689.6***	***1,112***	***800.1***
		487		***1,391.8***		***1,831.6***		***1,912.1***

Source: RACAC Draft IAP Report, 1996, State Forests of NSW, 1997, Margules Pöyry databases

Note that current harvest equates to current industry commitments.

INDUSTRY DEVELOPMENT OPPORTUNITIES

The following industry development opportunities have been considered.

Solid Wood Products

- Furniture grade timber and components, furniture blanks and cabinet making
- Hardwood Veneer
  - sliced and "fancy cut" such as crown cut for appearance grades
  - rotary peeled for laminated veneer products such as plywood and formply, LVL
- Structural and non-structural timbers
- Recovery sawn timber products
- Engineered flooring systems
- Specialty load-bearing timbers
- Moulded timber products
- Parquetry, furniture blanks and cabinet making.

Reconstituted Wood-based Panels

- Particleboard (PB)
- Medium Density Fibreboard (MDF)
- Oriented Strand Board (OSB).

Pulp and Paper Products

- Uncoated and coated woodfree printing papers
- Coated mechanical printing paper
- BHKP
- Newsprint and mechanical printing papers
- Woodchips for pulping.

MARKETS AND COMPETITIVENESS – HARDWOOD

The highest economic value from utilising the forest resource can be secured when production is concentrated in products in which the long term market prospects are good and in which the best competitive position may be achieved.

The long term markets for hardwood based solid wood products (sawnwood and plywood) both in Australia and in the Asia-Pacific region are facing a diminishing supply of large diameter logs. These markets can only be partly supplied by smaller diameter logs, and the prospects for reconstituted panels, such as MDF (medium density fibreboard), to substitute for the decreasing supply of solid wood products are good.

The two supply scenarios illustrated for hardwood in southern NSW represent a range of supply potentially available to industry post-RFA process. Current sawlog utilisation levels are below the potential available resource from the region under the "maximum woodflow" scenario.

Traditional markets for hardwood sawnwood have changed, and the last 5 to 10 years has seen a major shift into kiln dried products, most of which has been structural grade. Kiln driers that initially moved into F17 seasoned structural beams are now moving into appearance grade products. Given increasing softwood supplies and reduced domestic demand, it is possible that Australia could have

exportable timber surpluses by the year 2000. The need to increase the pace of change to 'reposition' hardwood out of traditional structural markets, where hardwoods compete directly with softwood, will be important. The process will involve an initial shift to kiln drying and then following through to more value-added products such as mouldings, componentry and flooring and panelling where available resource permits, and general "pallet/paling grade" products from lower quality raw material.

MARKETS AND COMPETITIVENESS – PULP AND PAPER

In paper markets, long term demand growth closely follows economic growth. Because of high economic and population growth, paper demand in the Asia-Pacific region is forecast to grow more than elsewhere in the world. The current growth estimates are about 5% per annum during the next 10 to 15 years, giving a solid basis for considering the status of the pulp and paper industry in the region.

The share of recovered paper in the consumption of fibrous raw materials in papermaking is forecast to grow further. However, the increase in recovered paper supply will be concentrated in lower quality grades. The utilisation of recovered paper in printing papers is currently low because of high quality requirements and the limited supply of high quality recovered paper. For this reason, compared with other paper grades, utilisation of recovered paper in printing and writing papers will remain low in the long term.

The paper industry based on the region can compete on an equal basis in printing paper. Since Australia is importing large volumes of printing paper, currently some 700,000 tonnes per annum, the main market for producers would be the domestic market. In other paper and paperboard grades, it is likely that future expansion of paper making capacity will rely on recovered fibre for additional fibre requirements.

The general cost level in the region, compared with the main competitors, is higher than average, especially regarding the cost of wood and transport costs to export markets. However, in future, with increasing export quantities, more efficient transport methods and reforms in harbour operations (such as those achieved in New Zealand), transport costs are likely to decrease, thus giving a better competitive position for the industry. Still it is likely that the cost level for the forest industry in the region will, in the long term, remain average.

MARKETS AND COMPETITIVENESS – SOFTWOOD

Significant potential exists for the softwood-based industry in southern NSW. The increase in resource availability will stimulate development in processing of both solid wood and reconstituted wood products. Softwood framing is expected to take a stronger and more stable position in the market over time. It is predicted that imports of structural softwood (eg Oregon from the Pacific North West and radiata pine from New Zealand) will continue until about 2007, at which stage Australia will have a net exportable surplus. Other options for utilising the sawlog resource include LVL and plywood.

Utilisation of the pulpwood resource in the region is likely to be concentrated on large scale investments in processing for panels (MDF, OSB), pulp and paper and/or linerboard.

DEVELOPMENT OPTIONS FOR THE INDUSTRY

Based on the findings of the market review and competition possibilities, the following development strategies for the region's forest industry are illustrated:

- increasing hardwood sawnwood value-adding, and adjustment of operations to utilise the increasing supply of regrowth and lower quality eucalypt sawlogs.
- significant expansion of softwood sawmilling across the region.
- expansion of existing or establishment of new industry utilising softwood pulpwood material.
- reconstituted panel production based on softwood (OSB, MDF).
- building worldscale mechanical wood production units as allowed by the forest resources for achieving full economies of scale.
- woodchip exports will continue as an outlet for surplus residues.

ASSUMPTIONS

In formulating potential forest industry growth scenarios for the region, assumptions are made about development possibilities which include the minimisation of impediments to investment in the respective industries. This means that there are no unnecessary obstacles to investing in the region's forest industry as compared with competing regions. More specifically, the assumptions in the scenario are:

- Availability of electric power and energy at competitive prices for future expansions.
- Possibility of utilising cost-efficient and rational transport methods and harbour operations.
- Internationally comparable wood royalties, road tolls and other similar payments/taxes for the industry in the region.
- No import duty protection in either the Australian or in the main export markets.
- Construction of a general purpose freight wharf at Eden (to minimise the significant additional costs and hence reduce competitive disadvantages associated with transporting forest products to Port Kembla).
- Provision of other infrastructural requirements (eg minimum road standards) for industry.

In addition to this, there must be long-term security of wood supply to enable industry to make large-scale investments in processing and in plantation development.

A summary of the growth potential of the industry in the region to 2020 under the assumptions stated in the report is as follows:

- a new MDF plant utilising both softwood and hardwood, with an annual intake of 300,000 m³ by 2010 and 500,000 m³ by 2020.
- a new hardwood sawmill, cutting the high quality ash resource, with a strong value-added focus.
- another new hardwood sawmill, cutting the non-ash resource, with a strong value-added focus.
- expansion of existing hardwood sawmills, with specific investment in kiln drying and value-adding facilities.
- two new world scale softwood sawmills, each with a capacity of 400,000 m³ pa, and significant expansion of existing softwood sawmilling.
- a new softwood LVL/plywood plant, utilising 120,000 m³ pa,
- establishment of a large pulp and paper development, utilising around 900,000 m³ pa of softwood pulpwood by 2010.

1. Introduction

The Australian Bureau of Agricultural and Resource Economics (ABARE) and the Economic and Social Technical Committee have engaged Margules Pöyry Pty Ltd (Margules) to identify industry development options for southern NSW illustrated by long term scenarios to 2010 and 2020. The study region is defined as the South CRA and Eden CRA regions. These will be referred to in the report as the southern NSW RFA region.

The background to this study is the inquiry into areas to be reserved under the New South Wales/Commonwealth Regional Forest Agreement, otherwise known as the RFA process. As part of a Comprehensive Regional Assessment (CRA), the value of economic and industry development is to be assessed. Given certain predictions on resource availability and technological advances in processing forest products, it is possible to construct long term scenarios for the forest industry in the region to 2010 and 2020. Importantly, this industry must not only be technically efficient and competitive, but it must also have a solid market base. Hence, the market for potential forest products has also been reviewed.

This study presents such illustrative development scenarios for the years 2010 and 2020 which are feasible as per the criteria illustrated in Section 4.1. There are other patterns of development which differ in terms of the specific mix of products and mill types, and the locations of mills, which may be feasible given satisfaction of these criteria.

The study covered three sectors:

- Resource supply (hardwood, softwood)
- Wood-based product competitiveness and potential markets
- Industry development options including solid wood products, reconstituted panels, and pulp and paper products.

RESOURCE

Resource assessment and subsequent forecasts of development are based on assessment of both hardwood and softwood from native forests and plantations, including both public and private growers.

COMPETITIVENESS AND MARKETS

Given the background of resource availability and the feasibility of processing the resource into various products, an assessment of the region's competitiveness in both the domestic and world markets, particularly the Asia-Pacific region is important.

The market assessment is undertaken on available data; utilising the databases within Margules Pöyry and the wider Jaakko Pöyry Consulting Network. Market trends have been predicted to 2010. As Margules has no forecasts beyond this time, trends in markets for specific products have been established and, unless

otherwise stated, will continue to be expressed to 2020. Hence, there is an assumption of "business as usual" from 2010 to 2020.

The cost competitiveness assessment is based on comparative analysis of the information supplied from mills in the region with hypothetical new mills in the selected main competing countries.

INDUSTRY DEVELOPMENT OPTIONS

Industry options will include those that are technically feasible and likely to be economically viable for utilisation of the resource available from 1997-2020. Various assumptions are made about improvements in technology particularly in sawing, kiln drying, finger jointing and further solid wood processing, and in the manufacture of panelboards and pulp and paper.

The Economic and Social Technical Committee was consulted in a series of workshops to ascertain likely development options to 2010 and 2020. Development options having the best market potential and likely to be competitive were presented to workshop participants. These options were considered in the context of participants' knowledge of resource distribution and characteristics, development infrastructure, socio-economic conditions in the region, and existing industry. From these discussions, development scenarios were proposed for 2010 and 2020.

As noted above, the scenarios represent commercially feasible patterns of development which make use of the projected resource. Different scenarios might equally well be proposed.

2.
Forest Resources

2.1
Global

The world's closed forest area consists of approximately 3.4 billion hectares. The total growing stock is around 385 billion m^3, of which 40% is softwood and 60% hardwood. The main hardwood resource is tropical rainforest. The vast majority of softwood forests are in the boreal and northern temperate zones, mostly Russia (50%) and North America. These forests have been the source of 70% of the world's industrial wood supply.

Fuelwood is an important forest product, representing 2.0 billion m^3, or nearly 56% of total wood use. Fuelwood is regarded in many regions as a low cost or free resource, and as such has been in short supply for many years. If more fuelwood had been available, consumption would have been higher. Defined in this way, the historical fuelwood shortage will increase in line with the increase in population, essentially in Africa, Asia and Latin America.

In 1995, the annual global harvest was around 3.6 billion cubic metres (m^3) of which 2.0 billion m^3 was for fuelwood and 1.6 billion m^3 for industrial purposes (sawlogs, veneer logs and pulp logs). Two-thirds of industrial roundwood is softwood, and fuelwood is predominantly hardwood of which around 90% is harvested and consumed in developing countries.

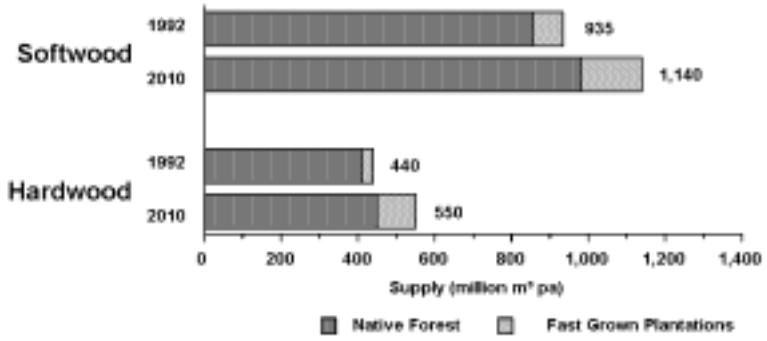
The global fibre usage is approximately as follows:

Fuelwood	56%
Sawlog and veneer logs	27%
Pulpwood	12%
Other products	5%

Commercial forest plantations will play an increasing role in the world's developing wood fibre supply:

- The global area of plantations covers about 135 million hectares, or 4% of the total forest area. Some 60% softwood and 40% hardwood. The vast majority are located in the northern hemisphere with China accounting for 20%, Russia 15% and Europe, Japan and North America 10% each.
- Industrial fast growing plantations (those with MAI's >12) cover 17 million hectares (or about 0.5% of the total global forest area), roughly evenly divided between hardwoods and softwoods. The area of industrial fast growing plantations is expanding at an annual rate of 600-800,000 hectares, mainly in Latin America, Oceania and Southeast Asia.
- The share of fast growing plantations of the world's industrial wood harvest is at present 7%. It is expected to double by 2010, but still be less than 20% by 2020.

Figure 2-1: Forecast for industrial roundwood supply in the world



2.2 Asia-Pacific

Over recent decades, the Asia-Pacific forests have been subject to heavy overcutting. The rapid depletion of forest cover and growing stock passed a critical milestone in the early 1980s when the region's wood raw material balance of trade turned from an export surplus into an import deficit. The current annual harvest is around 90-95 million m³ of softwood and 140-145 million m³ of hardwood. The net supply deficit for the region is around 21 million m³ per annum.

Northeast Asia, ie China, Korea and Taiwan have traditionally been dependent on imported wood. Despite rapid reforestation, establishment of plantations and improving infrastructure, any significant increases in harvesting levels will be restrained by the remoteness of forest resources and mountainous terrain. Scattered forest ownership (Korea), a shortage of forest labour (Taiwan), and increasing demand for forest recreation and conservation (Korea and Taiwan) are other major obstacles. The demand for wood in Northeast Asia as a whole continues to outstrip domestic supply, and many Taiwanese and Korean wood processing industries are now moving closer to raw material resources, mainly in Southeast Asia.

The shortage and high cost of domestic wood raw material and overseas competition have undermined the profitability of pulp production in Northeast Asia. The major Japanese paper companies have foreseen these drawbacks at an early stage, investing in upstream operations such as offshore pulp mills and/or fast growing plantations in North and South America, Oceania and Southeast Asia. The Korean and Taiwanese pulp and paper industries are now facing similar hardships and are likely to follow suit. Taiwanese and possibly also Korean market pulp capacity will be gradually withdrawn from the markets

through investments in integrated operations and the establishment of offshore captive pulp mills.

Though heavily utilised, the forests with the most significant supply potential are found in Indonesia, Malaysia and Indochina. The wood species in Southeast Asia's native forests are mainly medium to dense hardwoods (dipterocarpus spp.) which are excellent for production of solid wood products such as sawntimber and plywood. They make poor raw material for mechanical pulping, but are being increasingly used for bleached chemical pulp manufacture.

2.3 Australia

Australia has a total standing forest area of approximately 43 million hectares, representing 5% of the total land area. This is largely distributed in an arc around the eastern, southeastern and southwestern coasts of mainland Australia, and in Tasmania. The total forest harvest in 1995-96 was 18.4 million m³, approximately 60% of which was from native forest.

Source: RAC, 1992; ABARE 1996

Australia also has approximately 1.1 million hectares of plantation forest, most of which is softwood (950,000 hectares). Of the total plantation resource, 65% is radiata pine, 22% other softwoods, 12% eucalypt, and 1% other hardwood.

The annual harvest of native forest hardwood has varied with market cycles between 9.2 million m³ and 11.4 million m³ over the last 15 years, and is currently around 9.8 million m³. Softwood harvest levels have nearly doubled from 4.5 million m³ in 1980 to nearly 9.0 million m³ in 1995-96.

Table 2-1 shows production by end product for the 1994/1995 financial year. This includes both hardwood and softwood production.

Table 2-1: Production by forest product within Australia, 1994/1995 (000 m³)

Sawnwood	Panels	Paper and paperboard
3,691	1,445	2,294

Source: ABARE 1995.

Regarding sawnwood production, NSW and Victoria produced approximately 25% each of total sawnwood, Queensland approximately 20%, and SA, WA and Tasmania approximately 9.5% each. The ACT produced approx 1.5% of the total.

The approximate percentage of hardwood within the total sawnwood production in each State and Territory in 1995 was as follows:

NSW	53%
ACT	0%
Victoria	49%
Queensland	27%
South Australia	0%
Western Australia	67%
Tasmania	60%

2.4
Southern NSW RFA region

2.4.1 Forest definition – Hardwood

Composition of commercial species in forests in the southern region of NSW is more diverse in coastal forests than in the Tablelands or Tumut/Tumbarumba forests. The Tumut/Tumbarumba hardwood forests are characterised by alpine ash (*Eucalyptus delegatensis*) and mixed alpine forest including mountain gum (*E. dalrympleana*), manna gum (*E. viminalis*) and narrow-leaved peppermint (*E. radiata*).

The Tablelands forests are characterised by brownbarrel (*E. fastigata*) with messmate (*E. obliqua*), shining gum (*E. nitens*) and *E. radiata* as associates. Coastal forests include spotted gum (*E. maculata*), silvertop ash (*E. sieberi*), stringybarks (mainly yellow stringybark, *E. muelleriana*), and numerous associated species including messmate, mountain grey gum (or monkey gum, *E. cypellocarpa*), grey ironbark (*E. paniculata*), blue gum (*E. saligna*), grey box (*E. bosistoana*) and turpentine (*Syncarpia glomulifera*).

The Tumut/Tumbarumba forests are located on the southern tablelands of NSW west of the Great Dividing Range. These are more commonly known as the Bago-Maragle and Buccleuch State Forests.

The Tablelands forests stretch from Moss Vale south to the Victorian border and are generally those located west of, and along, the Great Dividing Range. The coastal forests stretch from Nowra in a strip to the range extending south to the Victorian border.

2.4.2 Forest definition – Softwood

The softwood forests in southern NSW relevant to the study have been classified into four broad supply zones: Tumut/Tumbarumba, Moss Vale, Queanbeyan/ACT and Bombala. The total plantation area in these forests is approximately 170,000 hectares. The majority (≅60%) of this resource is located on State Forest. Over the period of the study, the total softwood plantation resource in southern NSW is expected to rise to over 210,000 hectares, with increased new planting on both State Forest and private property in approximately the same proportions. The expansion of the plantation base will be in Tumut/Tumbarumba and Bombala only, with a total of about 20,000 hectares in each region planted to 2020 on both State forest and private property.

Although the plantations in the Oberon area are technically part of the southern NSW RFA region, they have not been addressed in any detail in this report because:

1. They do not fit with the other parts of the study region due to their geographic separation.

2. They are part of the Central Tablelands softwood resource which covers the Oberon, Lithgow, Bathurst and Orange areas.

3. Wood flows from the Central Tablelands to the Southern region have been very small and infrequent and are likely to remain so.

4. The resource in this area will not impact on other developments in the Southern region.

2.4.3 Data collection and interpretation

In order to quantify and qualify the potential resource available to industry for the period of the study, growers (public and private) and resource managers throughout southern NSW were contacted with requests for information. These requests indicated the level and detail of information required in order to estimate potential resource availability to 2020, and included both hardwood and softwood forest resources.

Information requested included current and projected availability of resource by product (sawlog, pulpwood) and grade (quality code, eg quota grade, non-quota grade). Industry was consulted to determine the current utilisation of this resource. Other information requested included plantation area, projections of plantation establishment rates to 2020 and digital data on forest and land use classification for southern NSW.

The hardwood forest resource in southern NSW is currently the subject of a number of studies affiliated with and/or a function of the RFA process. In order to minimise the possibility of conflicting resource data, two wood supply scenarios derived from the Resource and Conservation Assessment Council (RACAC) Draft Interim Forestry Assessment Report have been illustrated here. These are designed to represent a range of volumes that may potentially be available to industry post-RFA process, not defined outcomes of the process.

The “maximum woodflow scenario” represents the estimated sawlog volumes available to industry as found in column 3 on page 49 of the Draft Interim Assessment Process (IAP) Report for S1 and S2 regions, and column 2 on page 50 for the Eden Management Area. The “minimum woodflow scenario” represents the estimated volumes available to industry as found in column 7 on page 49 of the Draft IAP Report for S1 and S2 regions, and for the Eden Management Area, because the IDFA announced by the NSW government in September 1996 is slightly different from that represented by column 4 on page 50 of the Draft IAP Report of June 1996, the government’s minimum sawlog outcome of 20,000 m^3 per annum was adopted.

Hardwood pulpwood volume estimates are based on availability in each management area as by-products from sawlog operations conducted under current silvicultural prescriptions, together with available thinning volumes and sawmill residues. It is important to note that further silvicultural improvements and plantation yields would provide for an increase in the total resource above what is illustrated here.

Following are resource information summaries by supply region for southern New South Wales. These illustrate industry utilisation of forest resources across the region and projections of present and future availability (to 2020) of hardwood and softwood, public and private property forest resources.

Hardwood sawlog availability decreases over time under both woodflow scenarios. This is due to an estimated declining private property resource, both in quantitative and qualitative terms. Note that for sawlog, implications are that current level of industry may only be maintained if the assumptions under the "maximum woodflow scenario" are adopted.

It is important to note that from 2010 to 2020 there is a significant change in log grades available. Under the maximum woodflow scenario, quota logs drop from 68% to 44% of the total available where quota small increases from 14% to 38%. These changes are similar under the minimum woodflow scenario.

For hardwood pulpwood, increasing volumes are forecast to become available over time. Integrated harvesting currently practised in the Eden Management Area and "head-butt" harvesting in operation elsewhere will be replaced over time with regrowth thinning operations. These will concentrate on selective harvesting of suppressed stems to allow for high quality sawlog to grow on. Higher volumes of pulpwood will be generated under this system. Although recent changes in silviculture resulting in more retained trees may impact on woodflows, these impacts will not be significant during the period of this study.

Industry was consulted to ascertain the current cost competitiveness position of respective producers. This information has been utilised in preparing the cost competitiveness analysis, yet remains commercial-in-confidence.

Table 2-2: Hardwood resource descriptions - State forest and private property - Supply Scenario 1 - Maximising woodflow opportunities

	Current cut (1997)					Current potential					2010					2020				
Sawlog (000 m³)	Quota	Quota small	Salvage	*Sub-total Sawlog*	Roundwood products *	Quota	Quota small	Salvage	*Sub-total Sawlog*	Roundwood products *	Quota	Quota small	Salvage	*Sub-total Sawlog*	Roundwood products *	Quota	Quota small	Salvage	*Sub-total Sawlog*	Roundwood products *
Tumut/Tumbarumba	43.0	3.0	11.0	*57.0*	0	44.7	3.0	12.4	*60.1*	0	44.1	2.4	12.4	*58.9*	0	42.7	2.9	12.4	*57.9*	0
Tablelands	16.2	3.9	6.7	*26.8*	0	14.2	3.2	4.6	*22.0*	0	12.0	3.8	4.6	*20.4*	0	7.0	9.3	4.8	*21.2*	0
Coastal	62.8	21.0	7.5	*91.3*	0.8	70.8	22.8	10.2	*103.8*	3.5	70.9	19.4	10.2	*100.5*	7.0	31.2	56.5	8.7	*96.4*	7.0
Sub-total sawlog	*122.0*	*27.8*	*25.2*	*175.1*	*0.8*	*129.7*	*29.0*	*27.2*	*185.9*	*3.5*	*127.0*	*25.6*	*27.2*	*179.8*	*7.0*	*80.9*	*68.7*	*25.9*	*175.5*	*7.0*
TOTAL SAWLOG*				***175.1***	***0.8***				***185.9***	***3.5***				***179.8***	***7.0***				***175.5***	***7.0***

* includes poles, piles, girders and veneer

	Current cut (1997)					Current potential					2010					2020				
Pulpwood (000 m³)	Integrated	Residual	Thinning	Sawmill residue	TOTAL	Integrated	Residual	Thinning	Sawmill residue	TOTAL	Integrated	Residual	Thinning	Sawmill residue	TOTAL	Integrated	Residual	Thinning	Sawmill residue	TOTAL
Tumut/Tumbarumba	0	0	0	22.8	22.8	6.0	0	10.0	24.0	40.0	6.0	0	10.0	23.6	39.6	6.0	0	10.0	23.2	39.2
Tablelands	0	15.6	0	8.0	23.6	0	16.5	8.0	6.6	31.1	0	16.5	16.0	6.1	37.8	0	18.5	51.0	6.3	72.8
Coastal	312.0	74.3	50.0	27.6	463.9	358.0	92.0	123.0	32.2	605.2	358.0	92.0	313.0	32.3	763.0	0	92.0	733.5	31.0	830.0
Sub-total pulpwood	*312.0*	*89.9*	*50.0*	*58.5*	510.3	*364.0*	*108.5*	*141.0*	*62.8*	676.3	*364.0*	*108.5*	*339.0*	*61.9*	840.3	*6.0*	*110.5*	*794.5*	*60.5*	942.0
TOTAL PULPWOOD					***510.3***					***676.3***					***840.3***					***942.0***

Source: RACAC Draft IAP Report June 1996, State Forests of NSW 1997, Margules Pöyry databases

Table 2-3: Hardwood resource description - State forest and private property - Supply Scenario 2 - Minimising woodflow opportunities

	Current cut (1997)					Current potential					2010					2020				
Sawlog (000 m³)	Quota	Quota small	Salvage	*Sub-total Sawlog*	Roundwood products *	Quota	Quota small	Salvage	*Sub-total Sawlog*	Roundwood products *	Quota	Quota small	Salvage	*Sub-total Sawlog*	Roundwood products *	Quota	Quota small	Salvage	*Sub-total Sawlog*	Roundwood products *
Tumut/Tumbarumba	43.0	3.0	11.0	*57.0*	0	43.0	3.0	11.5	*57.5*	0	42.4	2.4	11.5	*56.3*	0	41.0	2.9	11.5	*55.3*	0
Tablelands	16.2	3.9	6.7	*26.8*	0	12.8	3.1	4.0	*19.8*	0	10.6	3.7	4.0	*18.2*	0	5.2	7.8	4.0	*17.0*	0
Coastal	62.8	21.0	7.5	*91.3*	0.8	53.7	19.3	6.4	*79.3*	3.5	53.8	15.9	6.4	*76.0*	4.2	22.9	44.2	5.85	*72.9*	4.2
Sub-total sawlog	*122.0*	*27.9*	*25.2*	*175.1*	*0.8*	*109.5*	*25.3*	*21.9*	*156.6*	*3.5*	*106.8*	*22.0*	*21.9*	*150.5*	*4.2*	*69.0*	*54.9*	*21.3*	*145.2*	*4.2*
TOTAL SAWLOG*				***175.1***	***0.8***				***156.6***	***3.5***				***150.5***	***4.2***				***145.2***	***4.2***

* includes poles, piles, girders and veneer

	Current cut (1997)					Current potential					2010					2020				
Pulpwood (000 m³)	Integrated	Residual	Thinning	Sawmill residue	TOTAL (check)	Integrated	Residual	Thinning	Sawmill residue	TOTAL	Integrated	Residual	Thinning	Sawmill residue	TOTAL	Integrated	Residual	Thinning	Sawmill residue	TOTAL
Tumut/Tumbarumba	0	0	0	22.8	22.8	6.0	0	10.0	23.0	39.0	6.0	0	10.0	22.5	38.5	6.0	0	10.0	22.1	38.1
Tablelands	0	15.6	0	8.0	23.6	0	11.8	6.0	5.9	23.7	0	11.8	11.1	5.5	28.3	0	11.8	32.1	5.1	48.9
Coastal	312.0	74.3	50.0	27.6	463.9	280.0	68.8	84.0	24.8	457.6	280.0	68.8	206.0	24.1	572.9	0	68.8	529.0	23.1	615.0
Sub-total pulpwood	*312.0*	*89.9*	*50.0*	*58.5*	510.3	*286.0*	*80.6*	*100.0*	*53.8*	520.4	*286.0*	*80.6*	*227.1*	*52.1*	639.7	*6.0*	*80.6*	*571.1*	*50.3*	702.0
TOTAL PULPWOOD					***510.3***					***520.4***					***639.7***					***702.0***

Source: RACAC Draft IAP Report 1996, State Forests of NSW 1997, Margules Pöyry databases

It appears under both scenarios hardwood pulpwood is not fully utilised. This is a function of one processing facility located in the south east corner of the region (as opposed to many geographically dispersed facilities located nearer the resource in the case of sawlog processing) and associated transport economics of haulage of the available resource.

Species characteristics of the resource and their distribution are also important considerations. For example, species generally unsuitable for export woodchipping within the southern NSW RFA region include the ironbark, box and bloodwood groups, as well as angophora species and turpentine. While a small percentage of these species is generally accepted by customers as a proportion of the overall mix, the major reasons for this lack of suitability are driven by end use - the colour of the timber may be too dark, thus requiring excessive bleaching and subsequent increased cost and fibre degrade, and unsuitable fibre characteristics causing problems in the paper production process. Species highly suitable for export woodchip production include the gum, stringybark and ash groups. The resource data for the southern NSW RFA region will be able to be greatly refined following the FRAMES process.

Sawmill residues have been included in the estimates of available pulpwood as a percentage of available sawn timber by supply zone by woodflow scenario.

Wood production from hardwood plantations has also been estimated. Under the maximum woodflow scenario, it is predicted that by 2010 around 2,300 hectares of plantations will have been established in the region with a focus on the coastal and tablelands supply zones (approximately 120 hectares per annum established). By 2020, it is predicted this resource will have expanded to 2,600 hectares, with woodflows expected to be approximately 15,000 tonnes of pulpwood per annum. The total estimated annual woodflow from this plantation estate is approximately 40,000 tonnes to be realised outside of the timeframe of this study. It is assumed that the 2,600 hectares will be able to be planted according to NSW State legislative requirements. It is understood that plantation establishment is progressing in the district on the Victorian side of the border.

Table 2-4: Softwood sawlog resource description - State forest and private property

Sawlog (000 m³)	Current cut (1997)	Current potentially available	2010 potentially available	2020 potentially available
Bombala	50.0	290.0	380.0	550.0
Queanbeyan/ACT	141.0	136.0	152.0	172.0
Moss Vale	30.0	40.0	40.0	40.0
Tumut/Tumbarumba	622.0	692.0	1210.0	1325.0
TOTAL SAWLOG	***843.0***	***1158.0***	***1782.0***	***2087.0***

Table 2-5: Softwood pulpwood resource description - State forest and private property

Pulpwood (000 tonnes)	Current cut (1997)		Current potentially available		2010 potentially available		2020 potentially available	
	Roundwood	Residue	Roundwood	Residue	Roundwood	Residue	Roundwood	Residue
Bombala	35	0.0	200.0	87.0	270.0	114.0	270.0	165.0
Queanbeyan/ACT	0	0.0	35.0	40.8	35.0	45.6	35.0	51.6
Moss Vale	12	0.0	12.0	12.0	12	12.0	12.0	12.0
Tumut/Tumbarumba	235.0	205.0	785.0	220.0	825.0	518.0	795.0	571.5
Sub-total pulpwood	*282.0*	*205.0*	*1032.0*	*359.8*	*1142.0*	*689.6*	*1112.0*	*800.1*
TOTAL PULPWOOD		***487.0***		***1391.8***		***1831.6***		***1912.1***

Source: RACAC Draft IAP Report 1996, State Forests of NSW 1997, Margules Pöyry databases

Softwood plantations are currently estimated at a total of 170,000 hectares for the region (excluding the Oberon/Bathurst resources). Current availability of softwood and levels of utilisation indicate significant potential for expansion of industry focused on this resource. Plantation expansion is also predicted for the two main supply areas: Tumut/Tumbarumba and Bombala. This is expected to account for additional planting of 20,000 hectares in each supply zone to 2020 (approximately 1,000 hectares per supply zone per year), with plantation expansion occurring on both State Forest and private property in approximately equal proportions. While the volume from these plantings will not have a large impact on this study, the future available volume of both sawlog and pulpwood from the expanded plantation resource will be significant.

Assumptions on plantation establishment rates have been made given historical establishment rates and, most importantly, industry and forest growers providing the impetus for such. The timing of this study relative to cognisant studies on potential availability of land for plantation establishment predicates conclusions, yet the established zones of softwood supply and firm indications by industry and growers contributing to the study allows for the assumptions described herein.

3.
Investment Risk - Implications for Forest Development

In assessing the feasibility of development options for the region, it is important to understand the impact of investor uncertainty on investment decisions, and what factors can reduce uncertainty and thereby enhance the likelihood of investment.

Fundamentally, what drives most companies to invest in forestry processing ventures, whether a small sawmill or a pulp and paper mill, is the prospect of making an acceptable financial return on the capital invested (ROI).

What represents an “adequate return” or, as it is often termed, the “hurdle rate” ROI varies with different investors, but at the very least, it must be more than can be achieved in passive investment options such as risk free bank accounts (the “risk free” rate). More generally, it may be defined as a rate of return which cannot be bettered by other options open to the investor that entail similar levels of risk. In general, the higher the perceived risk in a project, the higher the “hurdle rate”.

A risk assessment and risk minimisation strategy is critical to any prudent analysis of an investment.

In a general sense, risks associated with new forestry projects are viewed from three perspectives:

i. business risks - eg the capacity to meet supply agreements in both volume and quality terms, log pricing policies, infrastructural impediments, fluctuations in the cost of utilities and inputs, financial risks and market fluctuations in end products.

ii. environmental risks - drought, fire, wind, pests etc are included in this context.

iii. political or sovereign risks - risks associated with political forces, for example, changes that may occur in forest policy, resource access, taxation, licences, duties etc. These risks are difficult to quantify yet nonetheless real, and may include adverse impacts through external environmental restrictions on either the market (certification, labelling), raw material supply (resource access) or unforeseen environmental problems in regulations on processing etc. These risks can include both perception and reality.

Key factors on which forest product investors focus are:

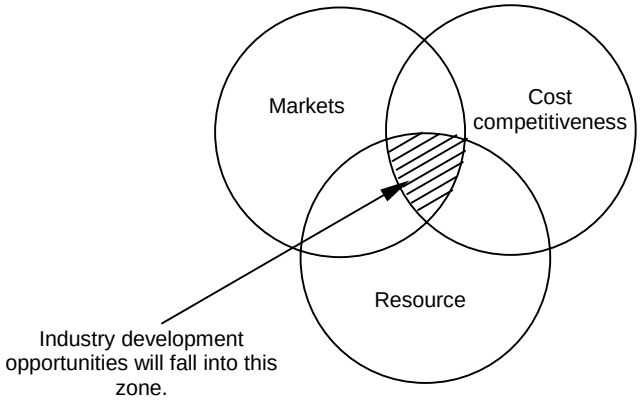
- end product price
- production cost
- security of necessary raw material supply, and
- security of access to key markets.

Uncertainty or risk associated with any of these factors will affect the likelihood of investment.

4.
Growth Scenario of the southern NSW RFA Region Forest Industry

4.1
Growth Scenario

The growth scenario presented here for the development of the wood-based industry in the region is governed by availability and quality of hardwood and softwood resources, the cost competitive position of the respective industry and market restrictions and opportunities.



A wide range of options have been analysed. For all the options included in the growth scenario, resource, competitiveness and markets are favourable. These represent one scenario for the development of the industry in southern NSW which best address the criteria above: a number of others may be suitable.

Total investment required for all developments is significant, hence development of the industry will be over the period to 2020.

The availability of resource, as well as a free, competitive business environment will all be essential for development.

Although developments in technology will represent new opportunities for the region, for this study only known and tested products have been included.

A working group was established to firstly identify opportunities for expansion and then examine the options associated with each of the outcomes. This was comprised of representatives from the Economic and Social Technical Committee, ABARE, Margules/Jaakko Pöyry, the sawmilling, veneer, pulp and paper, panel and woodchipping industries, and State Forests of NSW. The procedure for assessment and evaluation of investment and development options was as follows:

- industry and forest grower resource and cost data postulated and collated;

- market review provided by Margules to evaluate current cost competitiveness levels of the industry for the range of potential product/process options;
- options presented to the working group to determine which industries represented the most viable opportunities for expansion, and;
- decisions made on the industries or groups of industries for which expansion/development is likely to be most feasible.

As mentioned, all development options proposed need to satisfy markets, cost competitiveness and resource constraints in order to represent the most likely options for development.

4.2 Current structure of the industry

The main characteristics of the current industry structure are schematically presented in Table 4-1 and Figure 4-1 overleaf.

Table 4-1: Summary of structure of the southern NSW RFA region, present and possible future (hardwood)

Current	2010	2020
Existing Industry	Expansions of existing	Expansions of existing
Sawmilling	Sawmilling, value added focus	Woodchip exports
Woodchip exports	Woodchip exports	
Pallet production	Roundwood production	New plants
Components		
Furniture/joinery	New plants	
Roundwood - poles	Sawmill based on Ash resource	
- piles	Sawmill based on mixed species resource	
- girders		

It is predicted that, wherever economic haulage distance permits, the export of hardwood woodchips will continue from the region. Hardwood pulpwood, primarily for the production of woodchips for export, is an important commodity in the international marketplace. Japan is by far the world's largest importer, importing some 17.6 million m^3 of hardwood woodchips per annum. Australia provided approximately 23% of this volume in 1995/1996 (Source: ABARE, Japan Paper Association).

Hardwood pulpwood costs for Australia are slightly above those for Indonesia, Malaysia, Chile, Brazil and the US, and far below Scandinavia and Japan.

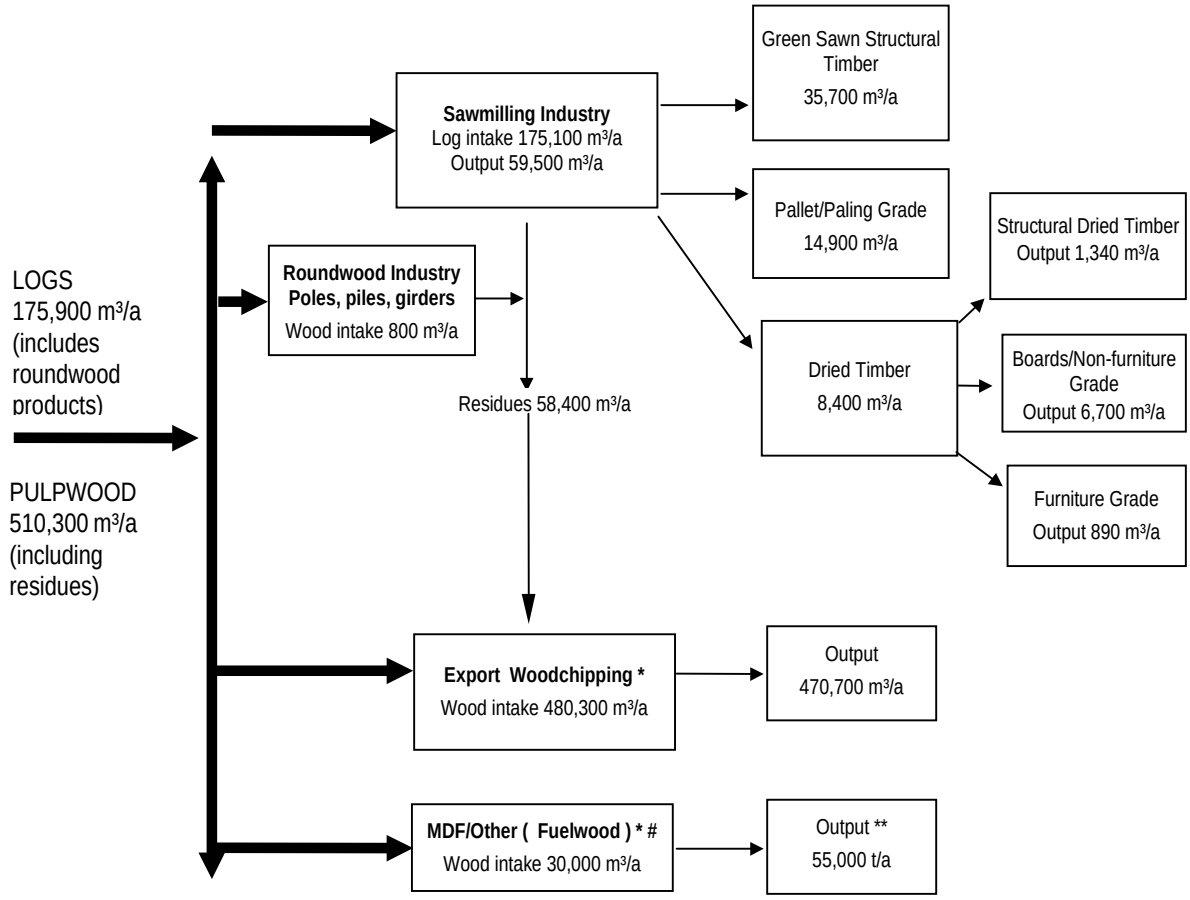
Present Australian exporters to the Japanese market are processing hardwood pulpwood in old, fully depreciated plants, with one notable exception. The production process is also relatively simple. Japanese purchasers place significant importance on regularity and dependability of supply and historical supply agreements and as such pay a premium for woodchips from Australia. The Japanese paper industry, because of its enormous domestic size, and guaranteed 100% sales (protected market), can afford to pay this premium for a quality product.

The capacity to pay of the export woodchip industry for their raw material, hardwood pulpwood, is therefore much higher than comparable industries in other countries. This higher capacity to pay is also in evidence in regard to sawmill residues. As the price for woodchips for export is higher than that which may be expected for domestic processing, sawmills within an economic haulage distance have the option to sell residues for export woodchip, generally achieving a higher price and hence making their operations more profitable.

It is anticipated that, over time, the protected position of the Japanese paper producers will diminish. This is already in evidence with companies investing in processing offshore, closer to raw material resource. This will, however, take considerable time. Also, the Australian hardwood resource will always be high quality in terms of its fibre characteristics, and even more so as increased thinning and plantation pulpwood becomes available. Therefore, it is predicted hardwood woodchip exports from the region will continue to 2020.

The capacity of the export woodchip industry to pay for both current and predicted future resource, is significant. Demand for hardwood woodchips from Australia is expected to continue to be firm, and the existence of the industry provides an economically attractive outlet for pulpwood and sawmill residues.

Figure 4-1: Current structure of the southern NSW RFA region forest industry - hardwood



* Note: intake numbers for industry include some resource from outside RFA region

\# Processing outside RFA region

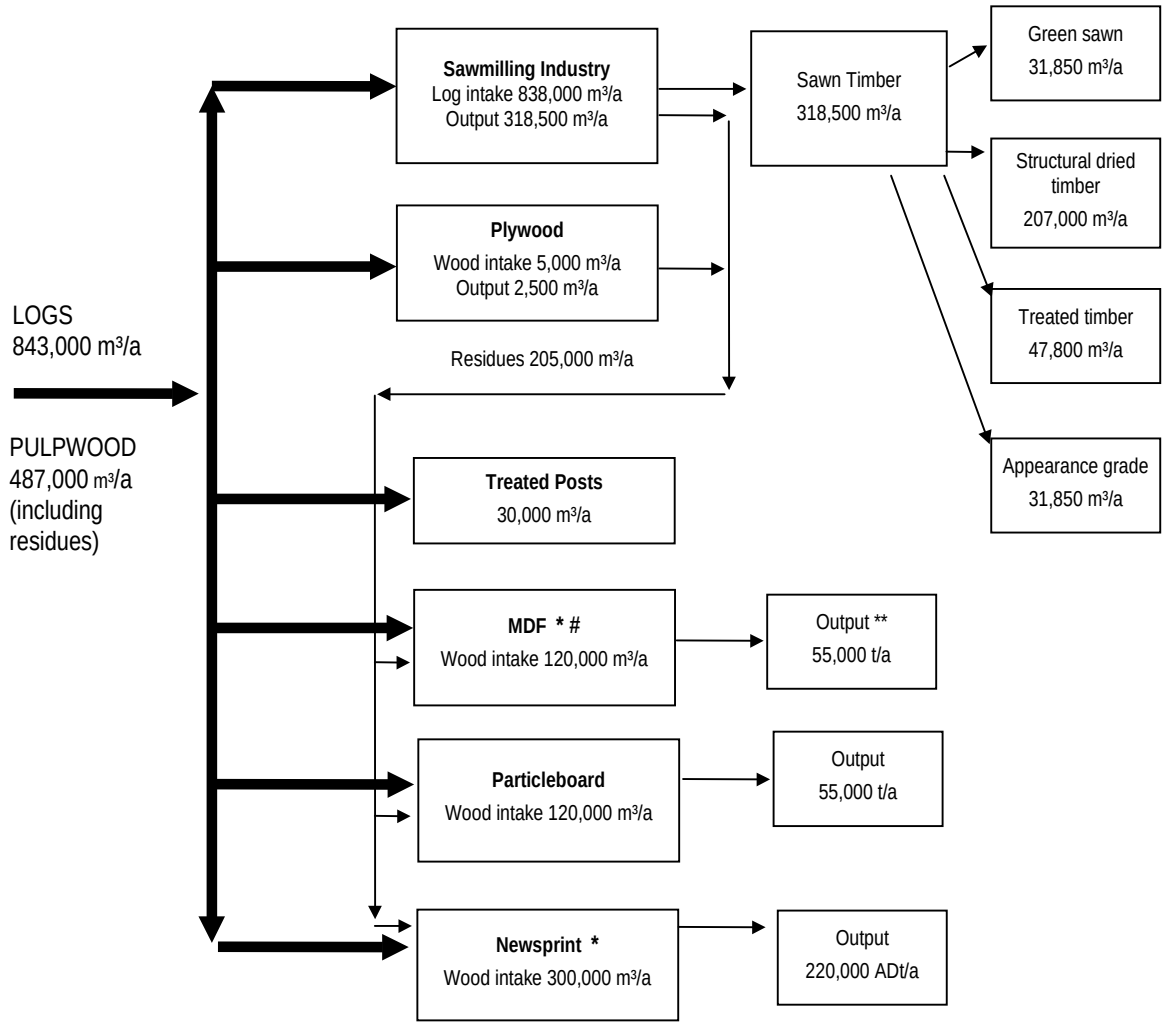
** Note: MDF plant takes both hardwood residue and softwood

It is important to note that the export woodchip industry draws some of its resource from outside the southern NSW RFA region. Presently, this figure represents approximately 300,000 m³ per annum, comprised of pulpwood roundwood and sawmill residues. This figure is anticipated to increase over time as wood supply from established plantations, private property timber, sawmill residues and pulpwood roundwood is readily available at competitive prices in neighbouring East Gippsland.

Table 4-2: Summary of structure of the southern NSW RFA region, present and possible future (softwood)

Current	2010	2020
Existing Industry	Expansions of existing	Expansions of existing
Sawmilling	Sawmilling	Sawmilling
MDF	Treated pine posts	Treated pine posts
Particleboard		
Newsprint manufacture	New plants	New plants
Treated pine posts	Sawmills	LVL/Plywood
Plywood	Pulp/Paper development	
	MDF	

Figure 4-2: Current structure of the southern NSW RFA region forest industry - softwood



* Note: intake numbers for industry include some resource from outside RFA region

Processing outside RFA region

** Note: MDF plant takes both hardwood residue and softwood

The existing plywood mill in Wagga Wagga has a small capacity of 5,000 m³ per annum roundwood intake. This mill could continue to operate if it establishes niche markets. Expansion of the operation would require capital investment which is more likely to be in a large scale mill closer to the resource.

4.3
Forecast for 2010 and 2020

4.3.1 Basic assumptions

In formulating a potential future structure of the industry, it is assumed that by 2010 there is a free competitive environment in the region. This, for example, means the following:

- There is free competition in the energy supply markets in the region. The possible increased power requirements for the forest industry must be supplied at competitive prices so that power supply does not limit the growth possibilities of the industry.
- Rational, efficient transport methods and harbour operations must be applied such as those applying in competing ports. This includes a general purpose wharf in Eden (as mentioned, to reduce the competitive disadvantage associated with transporting products to Port Kembla for export).
- Internationally comparable and realistic wood royalties, road tolls, fuel and other taxes must be applied.
- There must be no import duties, import quotas or other direct or indirect import barriers for forest product imports to Australia to protect the local producers.
- Provision of other infrastructural requirements (eg minimum road standards for industry).

In addition to this, there must be long-term security of wood supply to enable industry to make large-scale investments in processing and in plantation development programs.

This investment environment will mean that within the physical limits of the wood supply, those product/process options having good market prospects and competitive strength may be implemented in the medium to long term.

It must be stressed that for hardwood, the two supply scenarios illustrated represent a range of potential wood supply options which may be available to industry post the RFA process. Development options take into account and comment upon the effect of the present state of flux regarding resource supply in NSW.

It is critical to recognise that proposed developments, particularly in the case of softwood, are strongly interrelated with regard to integration of utilisation of both sawlog and pulpwood products. Industries that commence without markets for all end products, including by-products, will not have a long-term future.

4.3.2 Basic assumptions - Resource

The available resource in southern NSW governs the potential industrial development options within the region.

The hardwood resource in the region may be broadly categorised as alpine ash or mixed species. The alpine ash resource, located solely in the Tumut/Tumbarumba supply zone, represents the best opportunity for development of wood-using industries. This is due to the uniformity of the resource with regard to sawing and drying characteristics, its quality (strength, appearance) and its inherent fibre characteristics which are attractive for pulp and paper, panelboard manufacture, or export woodchip.

Hardwood plantations should also be considered in this category. While it is anticipated the majority of these will be located in the Coastal and Tablelands supply zones, the uniformity of resource characteristics and potential suitability for the same end uses as the ash resource, with the possible exception of sawn timber, allows for inclusion in the same category as the above. As mentioned previously, economic haulage distance is a critical factor in determining the catchment for resource supply to the export woodchip industry. Over time, the nature of the hardwood pulpwood resource will gradually change, with more regrowth and thinning material available under the stated silvicultural assumptions. This is much sought after by paper producers, and hence it is anticipated that utilisation of the hardwood pulpwood resource for woodchip export will continue from the existing facility in Eden, with resource being drawn from a potentially wider wood supply catchment based on quality and haulage constraints.

The mixed species resource, however, is less attractive for these end-uses in general as investment decisions need to take into account the inherent variability of the resource and the effects this will have on critical processing stages. For example, not all of the species in the Coastal supply zone are suitable for sawing and drying, yet some, such as spotted gum and blackbutt, are exceptional. Log quality is more variable in the native forest mixed species.

Also, some species are unsuitable for export woodchip, as end customers in Japan express valid concern over the quality of the fibre and its ability to be used in papermaking. Further research is required into the mixed species resource to more precisely define optimum end uses and hence development options for utilising this resource.

A summary is as follows:

Table 4-3: Hardwood resource potentially available under a "maximum woodflow" scenario

Sawlog (000 m^3)	Current harvest	Current potential	Potential2010	Potential2020
Tumut/Tumbarumba	57.0	60.1	58.9	57.9
Tablelands	26.8	22.0	20.4	21.2
Coastal	91.3	103.8	100.5	96.4
TOTAL	***175.1***	***185.9***	***179.8***	***175.5***

Pulpwood (000 m^3)	Current harvest	Current potential	Potential2010	Potential2020
Tumut/Tumbarumba	22.8	40.0	39.6	39.2
Tablelands	23.6	31.1	37.8	72.8
Coastal	463.9	605.2	763.0	830.0
TOTAL	***510.3***	***676.3***	***840.3***	***942.0***

Roundwood products (000 m^3)	Current harvest	Current potential	Potential2010	Potential2020
Tumut/Tumbarumba	0	0	0	0
Tablelands	0	0	0	0
Coastal	0.8	3.5	7.0	7.0
TOTAL	***0.8***	***3.5***	***7.0***	***7.0***

Table 4-4: Hardwood resource potentially available under a "minimum woodflow" scenario

Sawlog (000 m^3)	Current harvest	Current potential	Potential2010	Potential2020
Tumut/Tumbarumba	57.0	57.5	56.3	55.3
Tablelands	26.8	19.8	18.2	17.0
Coastal	91.3	79.3	76.0	72.9
TOTAL	***175.1***	***156.6***	***150.5***	***145.2***

Pulpwood (000 m^3)	Current harvest	Current potential	Potential2010	Potential2020
Tumut/Tumbarumba	22.8	39.0	38.5	38.1
Tablelands	23.6	23.7	28.3	48.9
Coastal	463.9	457.6	572.9	615.0
TOTAL	***510.3***	***520.3***	***639.7***	***702.0***

Roundwood products (000 m^3)	Current harvest	Current potential	Potential2010	Potential2020
Tumut/Tumbarumba	0	0	0	0
Tablelands	0	0	0	0
Coastal	0.8	3.5	4.2	4.2
TOTAL	***0.8***	***3.5***	***4.2***	***4.2***

Supply Scenario 1: "Maximum woodflow" - hardwood

Sawlog availability is fairly stable, reaching about 180,000 m³ per annum by 2010, and 176,000 m³ per annum by 2020. It is, however, expected that the established industry will develop further and over time fully utilise this resource, reducing the new mill options, with the major exception of the Tumut/Tumbarumba hardwood resources.

Availability of pulpwood roundwood is expected to reach about 840,000 m³ per annum by 2010 to 942,000 m³ per annum by 2020. Smoothing the estimated available pulpwood to 2020, annual availability is about 891,000 m³ per annum for the period 2010-2020.

Residues from sawmilling operations presently comprise about 58,000 m³ per annum. This volume is predicted to remain stable in line with predictions on sawn timber production.

Roundwood products (poles, piles, girders and veneer) availability increases gradually over time from 3,500 m³ per annum currently potentially available to 7,000 m³ per annum available in 2010 and 2020. This does not include availability from the Tumut/Tumbarumba region, although some volume may be expected, particularly from the high quality ash resource. Due to the relative isolation of the resource and associated transport economics, this will likely be utilised as very high quality sawlog and be processed into the maximum value-added end uses.

Supply Scenario 2: "Minimum woodflow" - hardwood

Resource trends are very similar to that under the "maximum woodflow" scenario, the major exception being the lower levels of resource available to industry. Current sawlog availability peaks at 157,000 m³ per annum, about 18,000 m³ per annum less than the current level of harvest.

By 2010, sawlog availability is about 150,000 m³ per annum, and by 2020, around 145,000 m³ per annum. Important implications of this supply scenario are that availability of sawlog is significantly below current industry utilisation.

Hardwood pulpwood availability under this supply scenario increases over time, mostly as a result of silvicultural practices (thinning of regrowth) as discussed previously. Total availability is predicted to be about 640,000 m³ per annum in 2010, rising to about 702,000 m³ per annum in 2020.

Roundwood products availability increases slightly over time from the 3,500 m³ per annum currently potentially available to 4,200 m³ per annum by 2010 and 2020.

An example of industry developments that may take place within southern NSW, taking into account established industry, the cost competitive position and market opportunities, is presented below.

4.3.3 Mechanical wood products industry development

Solid wood products - Hardwood sawnwood

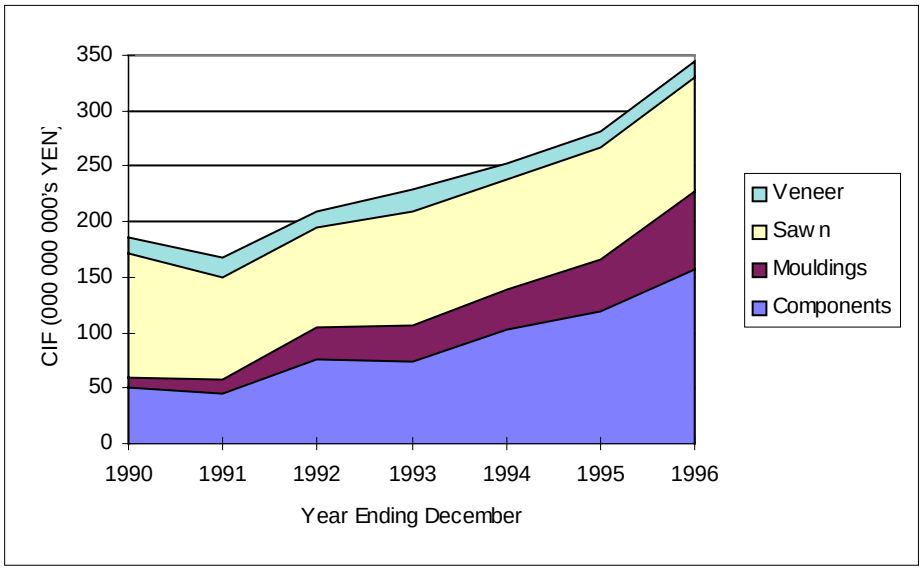
Hardwood sawnwood, with a focus on high-value end products, represents the most feasible opportunity for development in the region. It is predicted that the number of hardwood sawmills in the region will decrease as production is expected to be concentrated in fewer, large plants as opposed to dispersed small plants. Sawlog technology will be implemented to recover higher value products from the resource as it changes from the traditional "quota logs" to smaller logs and logs with higher levels of defect. This will include development of technology which enables the handling of short logs, smaller diameter logs and regrowth logs and sawn pieces, investment in kiln drying technology, and value-adding such as dressing and moulding. Investment in hardwood remanufacturing is expected. Development of the hardwood sawnwood sector will concentrate on value-added products for the rapidly expanding Asian markets (see over).

The types of outputs could include appearance grade products such as flooring, decking, panelling, furniture grades and components, window and door components, staircase components, parquetry, mouldings and edge laminated panels. Structural products could include F17, F27, and kiln dried bearers and joists for specialty applications, eg sports floors.

The mobile sawmilling industry will continue to operate in niche markets which are less price sensitive. The mobile sawmilling industry encompasses fixed mills, mobile mills and craftwood collectors. The industry in the region currently processes about 1,000 m^3 per annum of species such as stringybark, grey box, woolybutt, ironbark, bloodwood, messmate, and special species such as blackwood, sassafras, she-oak and silver wattle. Potential exists for small scale expansion of this industry given security of access to suitable resource and acceptable licensing and codes of practice for operations.

It is anticipated that by 2010, one new hardwood sawmill focusing specifically on cutting the high quality ash resource in the Tumut/Tumbarumba district will have been constructed. This mill will be strongly market-oriented with relation to cutting the resource and have kiln drying, dressing and moulding associated with the development. It is also anticipated that, in the same timeframe, another new hardwood sawmill focusing specifically on cutting the non-Ash resource in the Tumut/Tumbarumba district will have been constructed. This mill will be similar in concept to the above, but the inherent resource characteristics with respect to milling and drying of the mixed alpine species requires specific technology. These mills could be developed as one facility with two very distinct production lines, thus capitalising on shared drying, dressing and moulding facilities.

Figure 4-3: Total annual value of hardwood imports into Japan from Jan 1990 to Dec 1996



Source: NZFRI WoodWide forest products database.

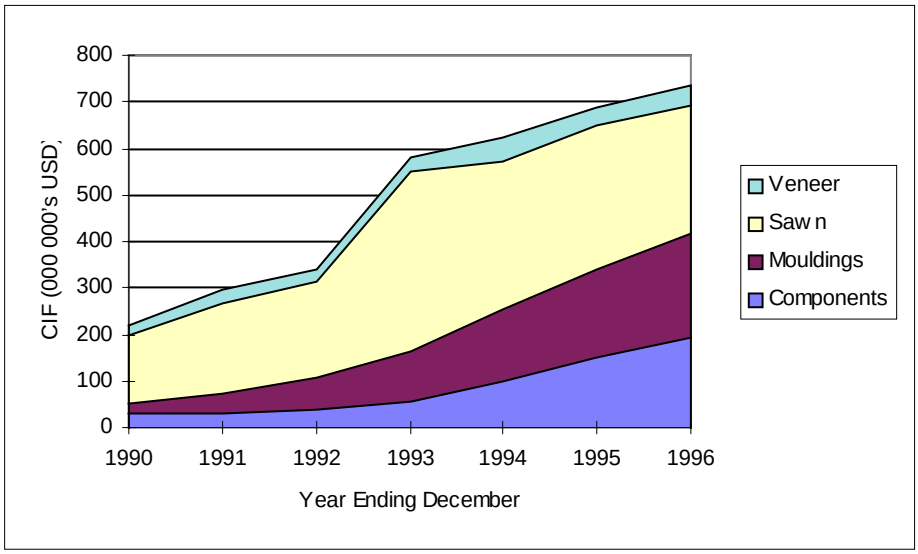
Figure 4-3 shows the total annual CIF value of hardwood imports by Japan. The value of hardwood mouldings imported by Japan has increased nearly sixfold between 1990 and 1996. Accompanying this increase has been the replacement of sawn hardwood by hardwood components as the most valuable hardwood product group imported by Japan. Hardwood components are usually seasoned, dressed and finished pieces for use in doors, windows and other high class joinery and in furniture manufacture. They simply require putting together either in a factory or "in situ". They thus represent the ultimate in value-added production and marketing.

Currently hardwood component imports equal a little under half the total value of all hardwood products imported by Japan. It seems likely, in the near future, the combination of hardwood mouldings and componentry will account for 75% of the value of all Japanese value-added hardwood imports.

CONCLUSIONS ON CURRENT HARDWOOD IMPORT TRENDS INTO JAPAN

- While the overall sawn hardwood market appears static, there has been significant growth in imports of mouldings and componentry.
- High labour and land costs are forcing more furniture manufacturers offshore contributing to rising imports of semi-finished products.
- The Japanese market for imported hardwood veneers is almost entirely influenced by Malaysian exports. Other exporters into this market seem to maintain their volumes during times when Malaysian exports fluctuate.

Figure 4-4: Total annual value of hardwood imports into Korea from Jan 1990 to Dec 1996



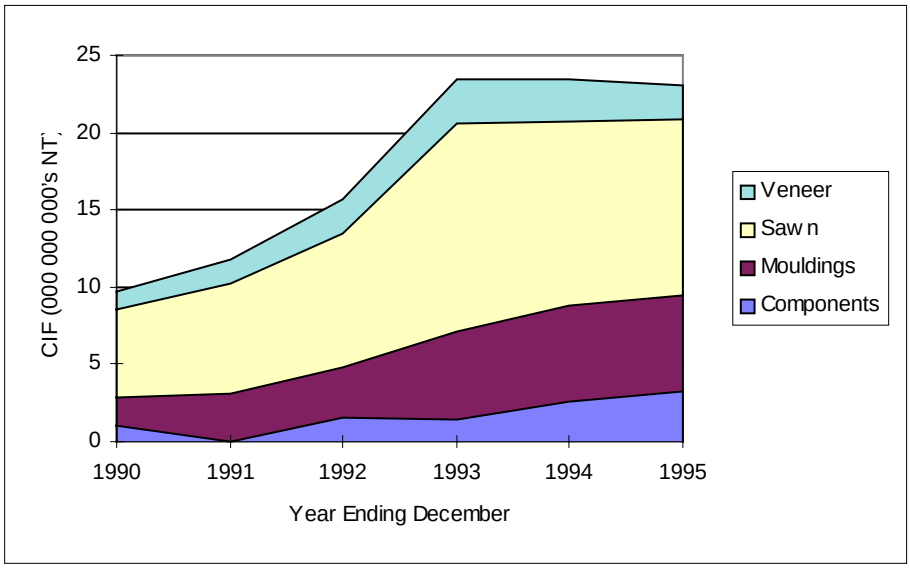
Source: NZFRI WoodWide forest products database.

Figure 4-4 shows the total annual value (CIF USD) of hardwood products imported by Korea. The major ramification for suppliers is that the combined value of components and mouldings now exceeds the value of sawn timber imports. The landed volume of hardwood components and mouldings in Korea would be much less than the volume of sawn hardwood of an equal CIF value. This suggests a lower unit freight cost involved in the export of components and mouldings to Korea, thus the opportunity to capture an increased margin may exist.

CONCLUSIONS ON CURRENT KOREAN IMPORT TRENDS

- Korean hardwood component imports from Malaysia, Indonesia and Thailand have risen from being insignificant in 1990 to over 50% of all component imports by 1996.
- The flattening of supply in tropical hardwood mouldings from Indonesia has been offset by increased supply from Malaysia.
- The value of veneer imports has shown little growth, relative to other hardwood imports.

Figure 4-5: Total annual value of hardwood imports into Taiwan from Jan 1990 to Dec 1995



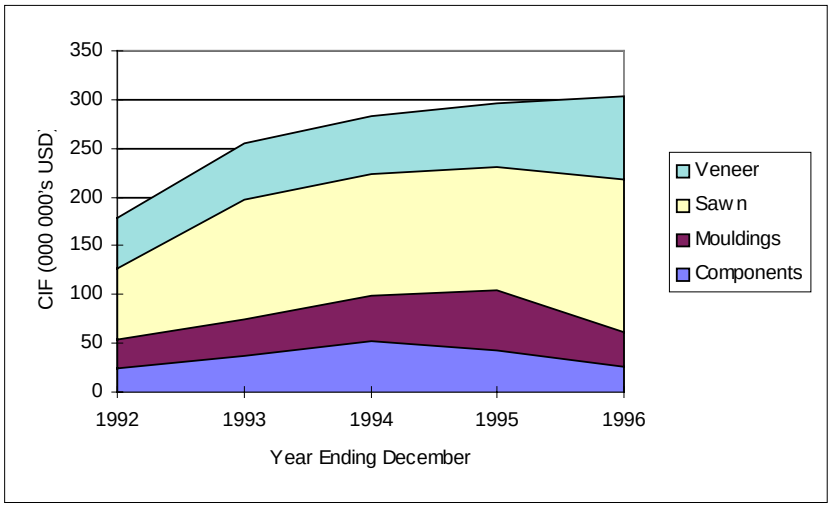
Source: NZFRI WoodWide forest products database.

There were sharp increases in the total annual CIF value of hardwood imports from 1990 to 1993. Thereafter, this value remained static (Figure 4-5). The CIF value of sawn hardwood imported by Taiwan from 1990 to 1995, has remained at about half the total CIF value.

CONCLUSIONS ON TAIWAN'S CURRENT IMPORT TRENDS

- The total value of hardwood imports peaked during 1993/1994 in Taiwan, and has since declined very slightly.
- Value of imports increased strongly pre-1993, but has since remained relatively stable, while volumes have dropped, indicating the increasing value of imported material.

Figure 4-6: Total annual value of hardwood imports into China from Jan 1992 to Dec 1996



Source: NZFRI WoodWide forest products database.

The total annual CIF value of hardwood imports has increased from about USD 180 million in 1992 to USD 300 million in 1996. However, this increase has been against the trend in terms of the relative importance of each of the products, ie sawn timber has increased its share of the total while mouldings and components have reduced. This is probably a reflection of China's stage of development and the sophistication of its markets.

CONCLUSIONS ON CURRENT CHINESE IMPORT TRENDS

- Combined CIF values for mouldings and component have risen consistently apart from 1996. However, components peaked in 1994.
- The CIF values for veneer and sawn timber have maintained a steady rise since 1992 with a relatively sharp increase in 1996.
- Overall, the total CIF value of Chinese imports seems to be flattening out.

Solid wood products - Hardwood roundwood

These roundwood products are essentially poles, piles, girders (for bridge members etc) and veneer. The poles, piles and girders are historically centred around the coastal species of high strength characteristics. These include grey ironbark, grey box, spotted gum, blackbutt (*E. pilularis*) and stringybark. Sales occurred mostly in the Nowra, Batemans Bay and Narooma areas to a preservative treatment plant at Mogo, with annual volumes of about 5,000 m^3. Poles were initially for domestic use, but prior to the plant closure in 1990, approximately one-third of poles were produced for export. Piles are usually produced from turpentine and as such have intermittent sales.

Currently, the industry is centred on Nowra/Batemans Bay with poles going to Koppers at Hume in the ACT.

It is anticipated that, due to the low cost in comparison to other materials, markets for these products will exist into the future. These will tend to become species-specific and concentrate on producing particular, very high value, end use products.

Solid wood products - Hardwood veneer

Current multi-aged forest may be expected to carry reasonably high levels of defect, thus rendering a large section of the resource unsuitable for veneer production. With a change to a predominantly regrowth resource over time, provided fire may be relatively excluded, it is anticipated veneer quality material will be available from this resource. Further study needs to be undertaken into the suitability of individual species for veneer, particularly face veneer, production. Species such as blackbutt and spotted gum are highly suitable for this type of veneer production.

As for poles, piles and girders, markets are expected to be species-specific, for example utilising the high quality spotted gum resource. Resource is insufficient for an industry based solely on this type of product, although potential exists for combi-ply or small quantities of hardwood veneer at, for example, the proposed Bombala supply zone plywood plant by 2020.

As mentioned previously, the relative isolation of the Tumut/Tumbarumba hardwood resource and associated transport economics would exclude this from the predominant areas of supply along the coast. Resource size is also limiting, hence the high quality material will likely be utilised as sawlog and be processed into the maximum value end uses.

Table 4-5: Softwood resource potentially available - southern NSW

Sawlog (000 m^3)	Current harvest	Current potential	Potential 2010	Potential 2020
Bombala	50	290	380	550
Queanbeyan/ACT	141	136	152	172
Moss Vale	30	40	40	40
Tumut/Tumbarumba	622	692	1,210	1,325
TOTAL	***843***	***1,158***	***1,782***	***2,087***

	CURRENT HARVEST		CURRENT POTENTIAL		POTENTIAL 2010		POTENTIAL 2020	
Pulpwood (000 m^3)	**Roundwood**	**Residue**	**Roundwood**	**Residue**	**Roundwood**	**Residue**	**Roundwood**	**Residue**
Bombala	35	0	200	87	270	114	270	165
Queanbeyan/ACT	0	0	35	40.8	35	45.6	35	51.6
Moss Vale	12	0	12	12	12	12	12	12
Tumut/Tumbarumba	235	205	785	220	825	518	795	571.5
TOTAL	***282***	***205***	***1,032***	***359.8***	***1,142***	***689.6***	***1,112***	***800.1***
		487		***1,391.8***		***1,831.6***		***1,912.1***

Source: RACAC Draft IAP Report, 1996, State Forests of NSW, 1997, Margules Pöyry databases

Solid wood products - Softwood sawnwood

The greatly expanded availability of softwood sawlog will lead to large scale expansion of the softwood sawmilling industry in the region, based on the Tumut/Tumbarumba and Bombala softwood resources. Limited opportunities exist for the Moss Vale and Queanbeyan/ACT areas for new softwood sawmilling capacity as existing industry is predicted to expand to absorb additional available resource.

The predicted availability of softwood sawlog, as discussed, will greatly increase by 2010, then again by 2020. For Tumut/Tumbarumba, a new worldscale sawmill is proposed, in addition to expansion of existing softwood sawmilling. By 2020, these developments will have expanded to account for all of the available softwood sawlog resource. For example, the new worldscale sawmill to be constructed could have a capacity of 400,000 m^3 per annum on each of two lines, thus a total capacity of 800,000 m^3 per annum. It is anticipated that the construction of such a facility, once established, will provide the flexibility to utilise all of the available resource, as this will significantly lower the likelihood of another similar facility commencing operations. The market base for product from these mills will be both domestic and export, particularly post-2007, when it is predicted Australia will have a net surplus of sawn softwood.

For the Bombala sawlog resource, it is anticipated that a worldscale sawmill of about 400,000 m^3 per annum capacity will be constructed by 2010, and an LVL/plywood plant utilising about 120,000 m^3 per annum by 2020. The sawmill will expand to utilise all of the available sawlog resource by 2020 as discussed above. Given Bombala's favourable location in relation to the proposed wharf at Eden, the likely markets for these products will be export-based.

Availability of residues from sawn timber production in Tumut/Tumbarumba are a critical component in the viability of the proposed linerboard development.

TREATED POSTS

A small treated pine post industry exists in the region with plants at Bombala, Moss Vale, Braidwood and the ACT. These plants will continue to supply the local market with growth opportunities restricted to general economic growth.

Wood-based panel products

MDF

This product represents an opportunity for production of wood-based panel products. The expanding market for MDF and cost competitive position of the industry indicates that MDF would be a viable option for development. Also, the existing plant in Wagga Wagga is below world competitive scale, and is expected to expand by 2010. MDF could utilise a proportion of hardwood pulpwood as illustrated by the Starwood (Hokushin) MDF development in northern Tasmania. This product is utilising 70% hardwood and 30% softwood in the board.

It is predicted that MDF will be in over-supply in the Asia-Pacific region until around 2004, when demand will once again outstrip predicted capacity expansions. Those MDF mills in the lower end of the cost curve, as is anticipated for the southern NSW RFA region, will be able to capitalise on this market opportunity.

It is anticipated that by 2010, an MDF plant predominantly based on softwood will have been constructed in the Bombala supply zone. The plant will be about 250,000 m³/a to 300,000 m³/a capacity intake. By 2020, the plant will have expanded to about 500,000 m³/a capacity intake, with 2 lines of 250,000 m³/a, one producing thick and one thin MDF for doorskins and moulded products, still predominantly softwood. The plant will utilise sawmill residue from the planned sawmill construction in the Bombala supply zone, roundwood from thinnings and hardwood from within an economic haulage distance as a part of the mix in the board. (About 15% under the maximum woodflow scenario and about 10% under the minimum woodflow scenario.) The change in percentage of hardwood input into the board reflects availability of hardwood by distance from the mill.

PARTICLEBOARD

Production of particleboard will be at a competitive disadvantage to other suppliers (refer cost competitiveness analysis). As a result, it is not anticipated that new particleboard production capacity will be developed in the region. However, expansion of the existing facility at Tumut is expected to satisfy domestic market demand, as the cost competitiveness position of the existing mill is favourable.

ORIENTED STRAND BOARD (OSB)

OSB represents a potential opportunity for utilising softwood pulpwood roundwood. However, the market in Australia and Asia-Pacific is very underdeveloped and the main producers in North America are facing a situation of oversupply. There are some new technology developments which would allow smaller scale plants to be competitive and if linked to a major market via a consumer or agent, then this type of product could easily have a future. This product, if produced as a part of an integrated development based in Bombala, would have an advantage in export markets as it would be in close proximity to the assumed Eden wharf. However, cost levels for the traditional North American style panel are high compared to international producers, and mill scale is an issue for plant location.

PLYWOOD, LVL AND VENEER

As mentioned, potential opportunities exist for the establishment of a plywood plant given the predicted downturn in future availability of mixed tropical hardwood peeler logs from traditional suppliers such as Indonesia and Malaysia. Further research into the suitability of native species for the production of hardwood plywood or LVL and softwood/hardwood combi-ply needs to be undertaken.

As substitution of softwood for hardwood timbers becomes more acceptable in the marketplace, market acceptance of softwood plywood will become more prevalent. Opportunities exist for expansion of the plywood industry as wood costs in the main competing countries increase, thus making Australian producers more cost competitive. As for OSB, if this development is located at Bombala, transport advantages being close to the assumed port at Eden will be important in cost competitiveness of the industry. It is anticipated that by 2020, an LVL or plywood plant will have been established in the Bombala supply zone. The mill will be about 120,000 m³ per annum capacity intake, and utilise the available sawlog resource. Residues will be sold to the MDF plant existing in the region.

4.3.4 Pulp and paper industry development

The volume of softwood pulpwood available to 2010 and 2020 gives rise to a number of potential development options for the region. The softwood pulpwood resource potentially available will also greatly increase over time. For Tumut/Tumbarumba, it is proposed that a large scale development or expansion of processing capacity in pulp and paper manufacture will occur. This may take the form of expansion of existing facilities, but will more likely represent production of kraft linerboard in the region. The anticipated development will utilise all of the available pulpwood (roundwood and residue) not otherwise committed to industry in the Tumut/Tumbarumba region, as well as a significant proportion of that available from Queanbeyan/ACT.

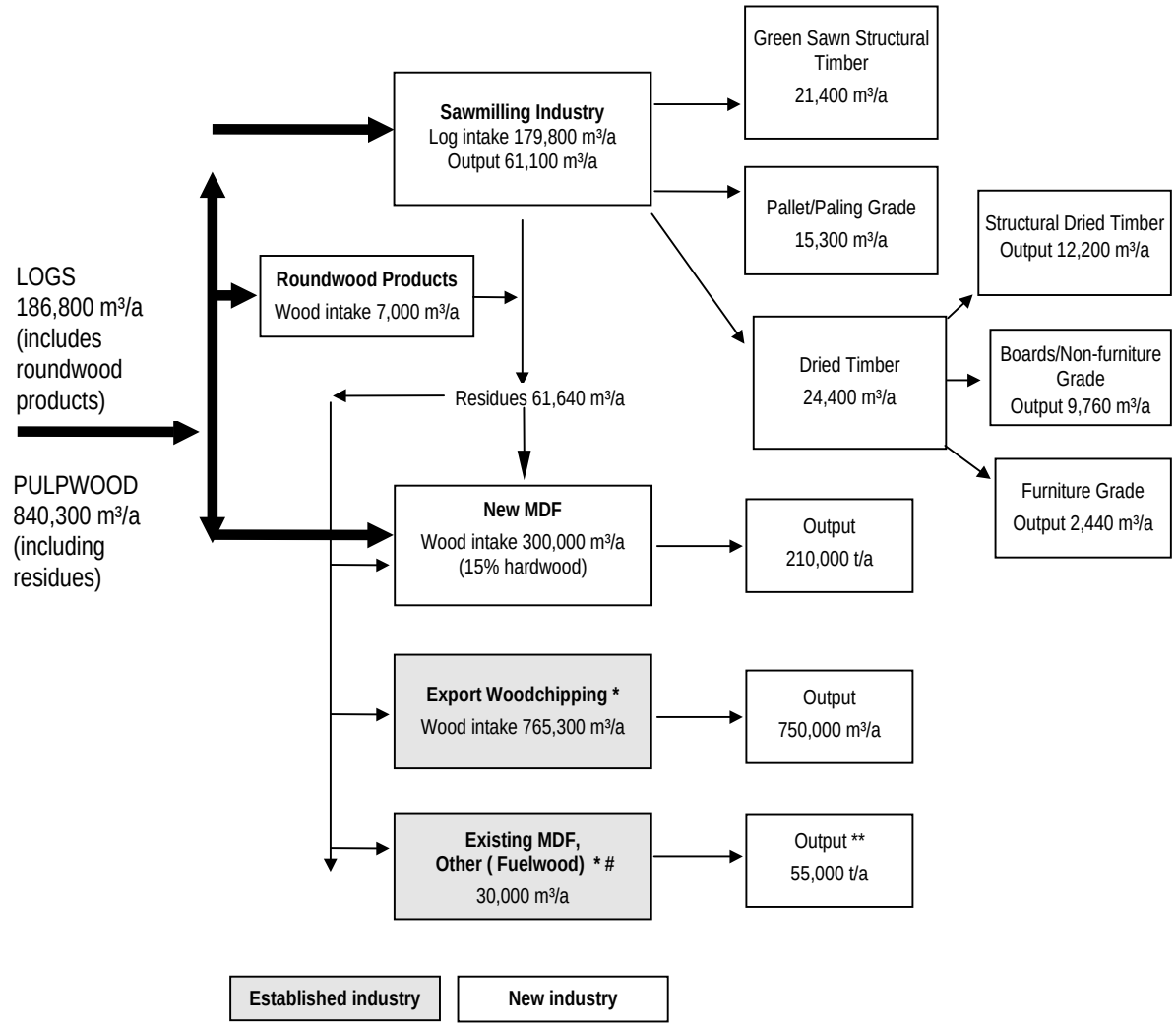
The hardwood pulpwood resources in the southern NSW RFA region are insufficient to support a worldscale (internationally competitive) BHKP mill, the product which represents the best opportunity for development from a market, eucalypt resource and cost competitiveness position. If the hardwood resources in East Gippsland are considered in concert with those from the Coastal Supply Zone (as others are outside economic haulage distance), a small by world standards 400,000 ADt/a mill could be built. However, costs are high compared to the main competing regions, particularly when supplying the Japanese market.

Given the relatively poor cost competitiveness position and lack of resource, a large scale pulp mill and paper development based on hardwood in the region has not been considered as a likely option for development.

4.3.5 Forecast structure for 2010 and 2020

The forecast forest industry structure in 2010 and 2020 is illustrated in Figures 4-7 to 4-12.

Figure 4-7: Forecast southern NSW RFA region Forest Industry Structure in the Year 2010 - hardwood under "maximum woodflow" scenario



* Note: intake numbers for industry include some resource from outside RFA region

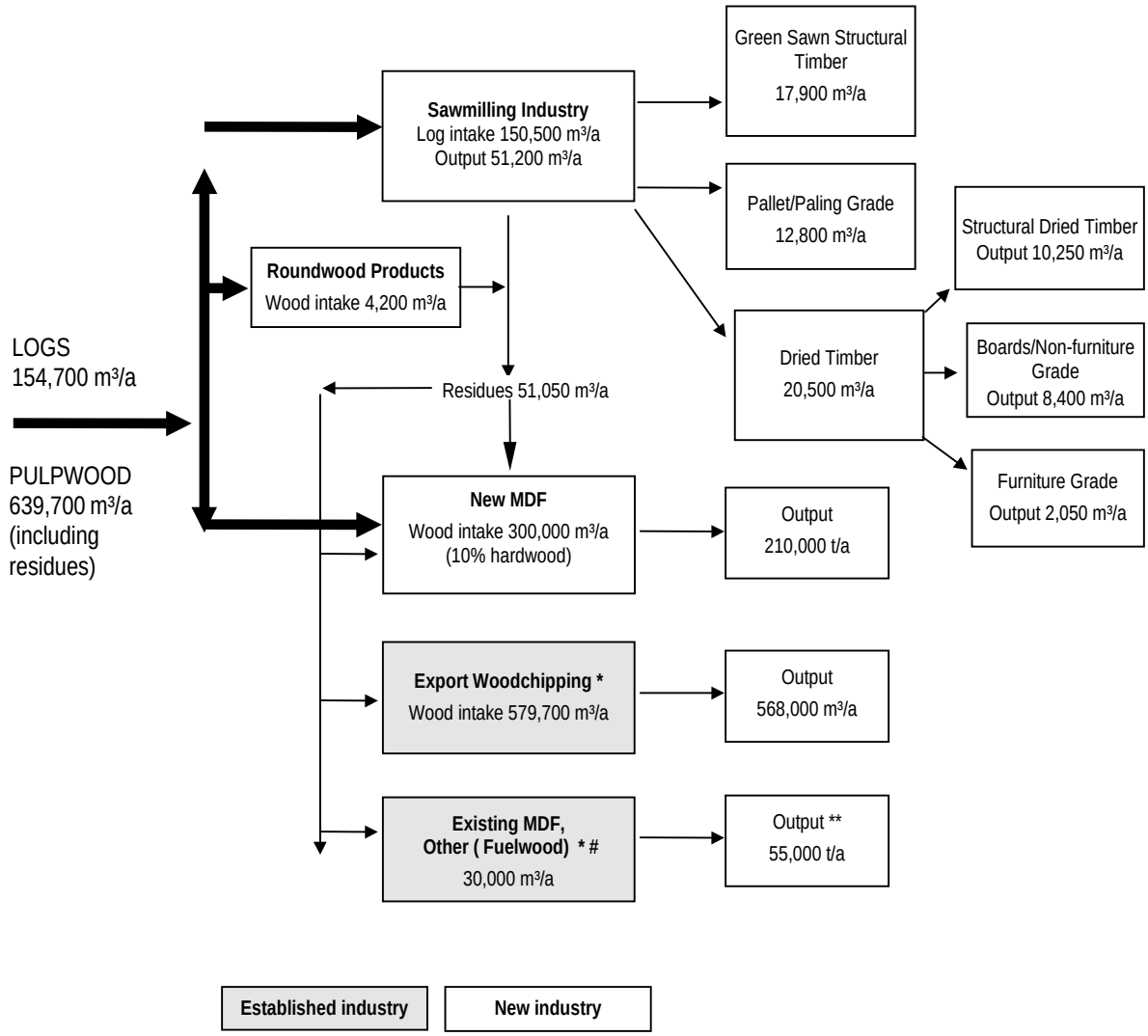
Processing outside RFA region

** Note: MDF plant takes both hardwood residue and softwood

It is important to recognise that the total remaining available pulpwood volume after panel industry utilisation has been allocated to export woodchipping. The distance of the mill from a proportion of the resource will make transport of some of this resource uneconomic, although all of this has been shown as available for ease of explanation. Also, the industry draws volume from outside the RFA region (see comments under Figure 4-1, page 17). This has not been shown in the figures above to illustrate the hardwood woodflows directly related to the RFA region.

It should also be noted that we have used the same proportions for sawn hardwood outputs for both the maximum and minimum woodflow scenarios. It is quite possible that the minimum woodflow will have a lower average log quality than the maximum woodflow. The impact will be increases in the lowest value products, ie pallet and paling grades, and reduced production of the value of dried products. The same impact could occur with the roundwood products. It is not possible to quantify the impact of a change in log quality, however, sawmills would be less viable and employment would decrease.

Figure 4-8: Forecast southern NSW RFA region Forest Industry Structure in the Year 2010 - hardwood under "minimum woodflow" scenario

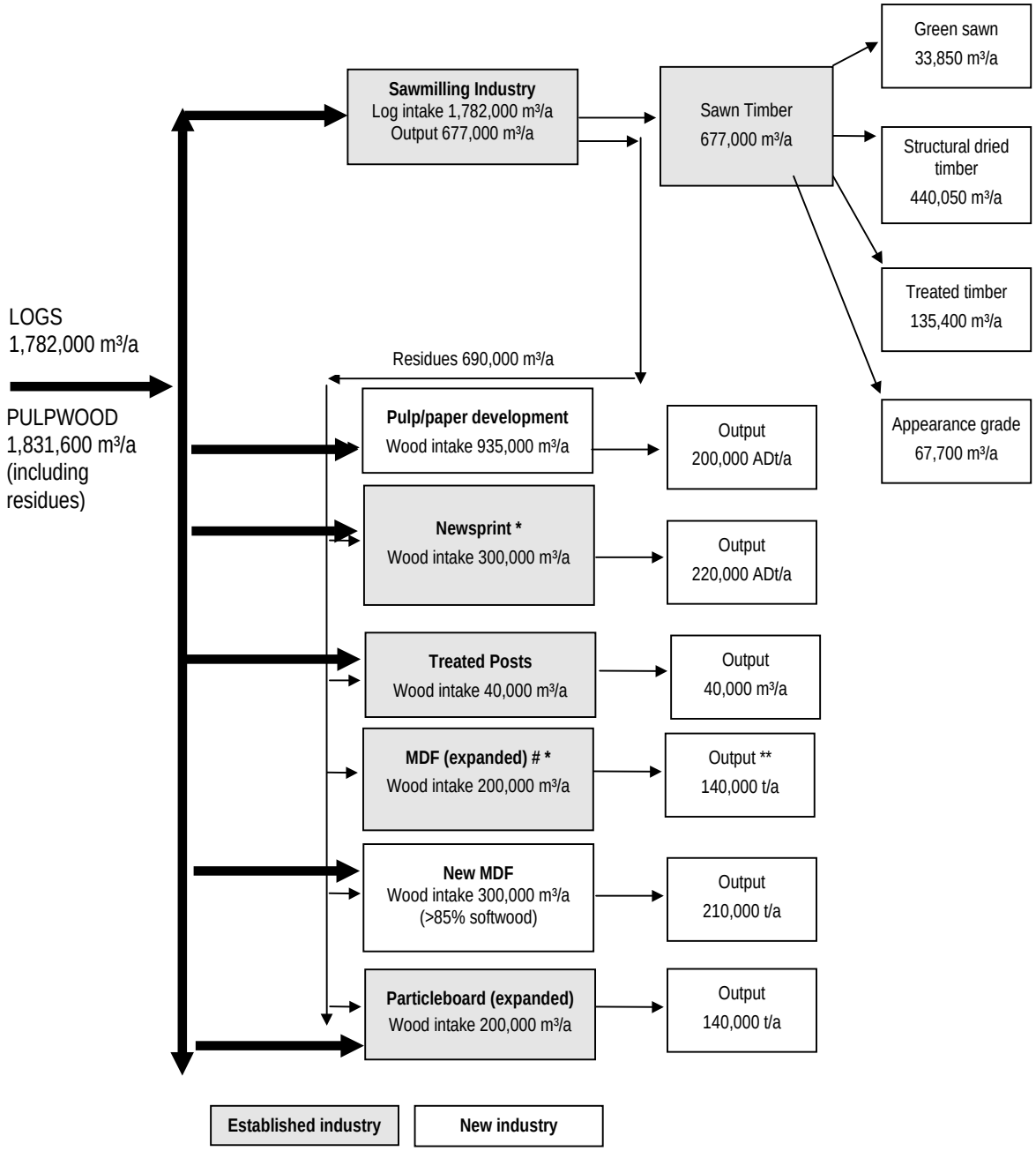


* Note: intake numbers for industry include some resource from outside RFA region

Processing outside RFA region

** Note: MDF plant takes both hardwood residue and softwood

Figure 4-9: Forecast southern NSW RFA region Forest Industry Structure in the Year 2010 - softwood

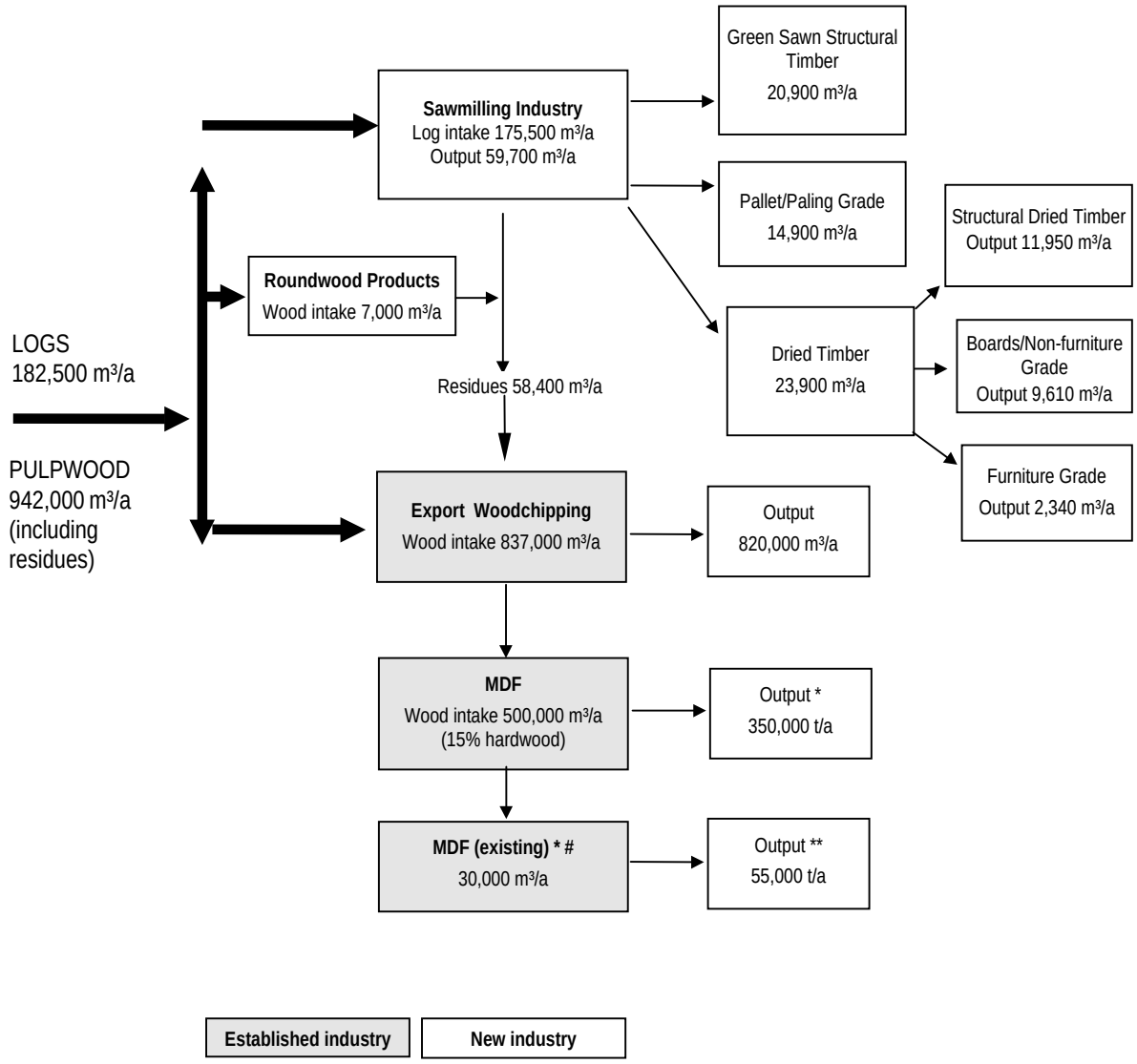


* Note: intake numbers for industry include some resource from outside RFA region

Processing outside RFA region

** Note: MDF plant takes both hardwood residue and softwood

Figure 4-10: Forecast southern NSW RFA region Forest Industry Structure in the Year 2020 - hardwood under "maximum woodflow" scenario

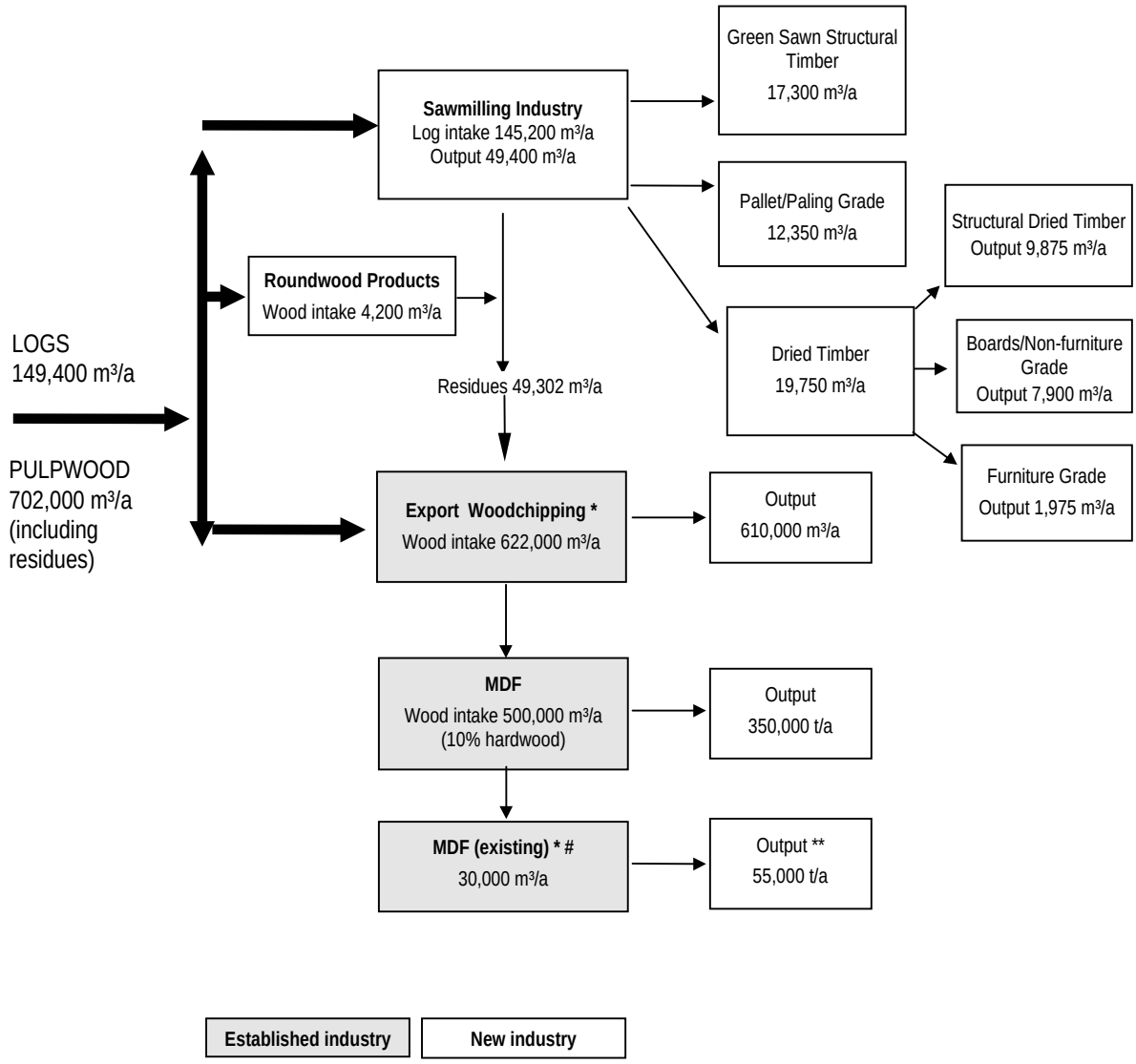


* Note: intake numbers for industry include some resource from outside RFA region

Processing outside RFA region

** Note: MDF plant takes both hardwood residue and softwood

Figure 4-11: Forecast southern NSW RFA region Forest Industry Structure in the Year 2020 - hardwood under "minimum woodflow" scenario

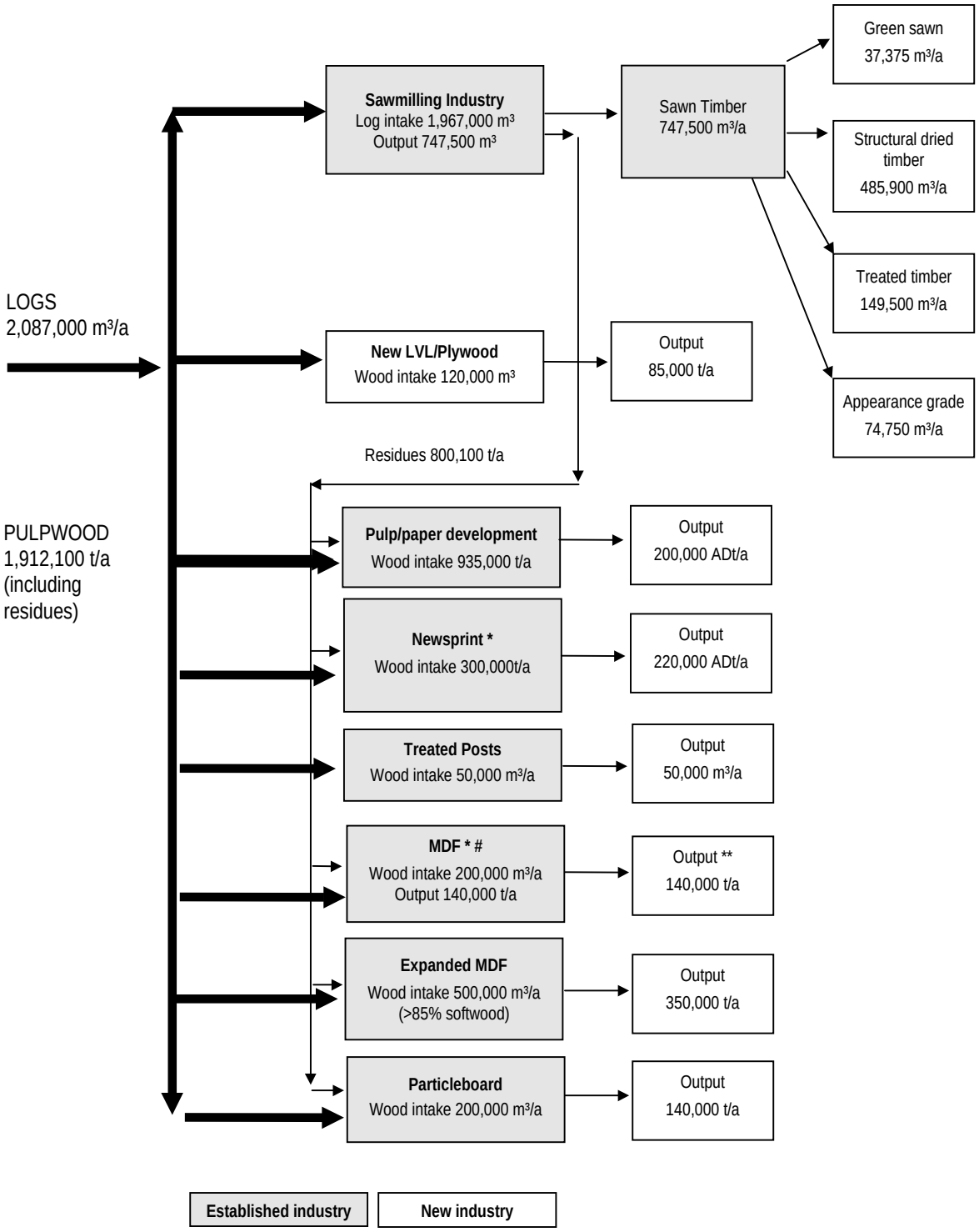


* Note: intake numbers for industry include some resource from outside RFA region

Processing outside RFA region

** Note: MDF plant takes both hardwood residue and softwood

Figure 4-12: Forecast southern NSW RFA region Forest Industry Structure in the Year 2020 - softwood



* Note: intake numbers for industry include some resource from outside RFA region

Processing outside RFA region

** Note: MDF plant takes both hardwood residue and softwood

Employment figures

Following comment on the draft report, Margules has included the following figures for reference. These are based on internal best estimates of industry employment figures. This request is not in the Terms of Reference and these figures have been included as a guide only. More detailed study is required specifically investigating new mill options and employment effects.

Table 4-6: Predicted industry output and employment effects to 2020 (hardwood - maximum woodflow scenario)

	2010		2020	
Product	**Production volume/output (m³/a)**	**Direct employment**	**Production volume/output (m³/a)**	**Direct employment**
Sawmilling - green sawn	21,400		29,900	
- pallet/paling grade	15,300		14,900	
- structural dried	12,200	148	11,950	148
- dried boards	9,760		9,610	
- furniture grade	2,440		2,340	
Roundwood products	7,000	18	7,000	18
MDF	75,000	45	105,000	63
Export woodchipping	798,400	175	866,500	193
TOTAL		**386**		**422**

Source: Margules Pöyry internal estimates

Table 4-7: Predicted industry output and employment effects to 2020 (hardwood - minimum woodflow scenario)

	2010		2020	
Product	**Production volume/output (m³/a)**	**Direct employment**	**Production volume/output (m³/a)**	**Direct employment**
Sawmilling - green sawn	17,900		17,300	
- pallet/paling grade	12,800		12,350	
- structural dried	10,250	122	9,875	118
- dried boards	8,400		7,900	
- furniture grade	2,050		1,975	
Roundwood products	4,200	10	4,200	10
MDF	60,000	34	80,000	46
Export woodchipping	585,700	130	622,000	138
TOTAL		**296**		**312**

Source: Margules Pöyry internal estimates

It is important to note that for industries in the early stages of processing where volatility in production volume/output is great, fluctuations in employment figures will be correspondingly significant.

Table 4-8: Predicted industry output and employment effects to 2020 (softwood)

	2010		2020	
Product	**Production volume/output (m^3/a, ADt/a for pulp/paper and newsprint)**	**Direct employment**	**Production volume/output (m^3/a, ADt/a for pulp/paper and newsprint)**	**Direct employment**
Sawmilling - green sawn	33,850	640	37,375	700
- structural dried	440,050		485,900	
- treated timber	135,400		149,500	
- appearance grade	67,700		74,750	
Pulp/paper	200,000	132	200,000	132
Newsprint	220,000	140	220,000	140
Treated posts	40,000	53	50,000	67
MDF	350,000	200	490,000	280
Particleboard	140,000	80	140,000	80
LVL/Plywood	-		85,000	105
TOTAL		**1,245**		**1,504**

Source: Margules Pöyry internal estimates

5.
Other Factors with a bearing on the Development Scenarios

5.1.1 Alternative fibres

The global use of non-wood fibre, such as straw, reed, bagasse, bamboo, cotton, cotton rags, hemp and kenaf is limited, representing only about 5 to 6 % of the total fibre furnish in paper and paperboard production throughout the world. The main reasons for the limited utilisation of non-wood fibres are related to inferior quality, poor economics and environmental problems. However, in the PR of China and in India, the role of non-wood fibre is significantly higher; raising the question as to whether non-wood fibres could also be used in paper production in the southern NSW RFA region.

Certain non-wood fibres such as cotton, flax, hemp, *Abaca* (manila hemp), *Crotalaria* (sunn hemp) and sisal have long fibres suitable for use in specialty papers such as security papers. The markets for these paper grades are too small in Australia for considering a new paper machine. Export possibilities are also limited because of the specific market characteristics of each market area.

Most of the non-wood fibre in papermaking is straw and bagasse, ie by-products of agriculture. Bagasse is also used as fuel at sugar mills. Its use in paper production is feasible only if alternative low-cost fuel is available for sugar mills.

The utilisation of straw generates a number of quality, techno-economic and environmental problems. Fibre yield from the harvesting of straw is typically slightly over 2 BDt of straw per hectare, and the pulping yield is thus about 1 ADt pulp per hectare. A straw pulp mill would thus require an annual harvesting area of about 600,000 hectares to be economical. This normally leads to uneconomical transport distances (transport costs are relatively high, straw being a very bulky material).

The high content of silica in straw makes chemical recovery of the spent cooking liquor difficult. Without a system for removing silica, the viscosity of the spent cooking liquor in the evaporation stage becomes very high at consistencies below 50% which inhibits burning of cooking liquor in the recovery boiler. With special process modifications and consequent additional investment, it is possible to operate chemical recovery with acceptable results. When considering high transport costs for straw and high investment costs for chemical recovery, the profitability of straw pulping is poor.

The straw pulp industry in the PR of China and in India is based on small-scale pulp mills without chemical recovery, resulting in significant environmental problems: both directly in creating heavy effluent loads and indirectly in not recovering the cooking chemicals nor the calorific value of spent cooking liquor. The outside energy requirements are thus large for producing cooking chemicals (caustic soda) and steam for cooking. This energy is generated with local coal, often of high sulphur content.

Less demanding quality requirements for end use of paper in the Chinese and Indian markets have made it possible to use large amounts of low quality straw pulp in

papermaking. The accumulating environmental problems as well as the increasing use of modern photocopying and printing machines will limit the suitability of straw pulp in paper in these markets in the future.

The overall impact of non-wood fibres on future long-term development possibilities of the region's paper industry will remain insignificant.

5.1.2 Technological developments

Over the period of the study, it is likely that developments in technology will continue. This will in turn develop new opportunities and alter competitive positions within the global forest industry, for example, as previously mentioned, increasing the economy of scale requirements of pulp mills and value-adding in solid wood products.

Developments in forest management and silviculture could increase productivity (and thus sustainable yield) from both native and plantation forests. Technological advances and market developments could also enable the processing of some of the pulpwood resource into sawn timber or veneer.

Potential changes are likely both within the pulp and paper and mechanical wood products industries. Within the sawmilling industry, developments such as substitution of traditional saws by knife type, and water/fluid type log breakdown will present new opportunities and increase recovery.

Within the wood-based panels industry, present technology will develop further, and presently unknown products will enter the market. These new products will increasingly utilise resource and expand end uses for products, thus increasing the opportunities for utilisation of the available resource.

5.1.3 Timber Certification

Timber certification may be an international means of signalling progress towards sustainable forest management. Certification has a role to play in regaining public confidence in the industry as a whole.

The current driving force behind timber certification is the desire by major environmental groups to ensure sustainable forest management by controlling marketing of finished products. In order to be effective, certification criteria must:

- be voluntary, transparent and supported by forest owners, managers and the public
- be connected to the RFA process
- have clear links with international standards
- involve wide survey/participation of forest users
- enable comparison of environmental performance standards between regions.

Timber certification in Australia will become more common in the future. The main drawbacks include the cost of third party auditing, a perception that consumers won't pay more for certified timber, and logistical difficulties of maintaining a documented "chain of custody" of timber from forest to hardware store.

5.1.4 Substitution

The substitution of hardwood by softwood has been evolving in relation to availability and market development. While the substitution of softwood for hardwood has been strong in recent times, particularly in the house framing market, the pace is expected to slow as hardwood consolidates its market share. The market for hardwood is now based on structural and appearance grade products, specifically utilising the inherent qualities of Australian hardwoods, for example hardness, strength, grain pattern, colour and in more recent times, the appearance of “defects”. Softwood plywood will be substituted for hardwood plywood for some applications, however, this cannot cover all applications, especially where strength and thickness, hardness and surface finish are important. As long as hardwood remains cost competitive, it is expected to consolidate market share against some imported products, and domestic sawn softwood.