Forest Industry Development Options

Northeast Region

A project undertaken as part of the NSW Comprehensive Regional Assessments

October 1998

FOREST INDUSTRY DEVELOPMENT OPTIONS

NORTHEAST REGION

Prepared by FORTECH

for ABARE

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the Joint Commonwealth NSW Regional Forest Agreement Steering Committee
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This report was prepared by FORTECH for the Australian Bureau of Agricultural and Resource Economics (ABARE) for input into ABARE's Forest Resource Utilisation Model (FORUM).

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PROJECT SUMMARY

This report describes a project undertaken as part of the comprehensive regional assessments of forests in New South Wales. The comprehensive regional assessments (CRAs) provide the scientific basis on which the State and Commonwealth Governments will sign regional forest agreements (RFAs) for major forest areas of New South Wales. These agreements will determine the future of these forests, providing a balance between conservation and ecologically sustainable use of forest resources.

Project objectives

Methods

Key results and products

Note: needs to go into the above format.

This report provides an initial assessment of industry development options for both the upper and lower northeast regional forest agreement regions in NSW. These options have been identified from analysis of forest resource scenarios, current industry structure and competitiveness, and identified market opportunities for the forest industries in the two regions.

In recent years the volume of resources available to the forest industry in both regions has been significantly reduced and the nature of available resources has been changing from old growth forests to regrowth forests. Consequently, the industry has been undergoing substantial structural adjustment.

The forest industries make a significant contribution to the economies of both regions and, despite the significant structural change that has occurred, **current industry participants have a positive vision for the future and see significant development opportunities**. This has already been reflected in substantial investments in value added processing, both in the native hardwood processing industry and in the softwood industry. Market opportunities also suggest there is substantial scope for development of the forest industry in both regions.

Continued development will be dependent on increasing available resources and providing long term contractual resource security. This is illustrated in the analysis of wood supplies under a range of resource supply scenarios, comprising 50%, 100%, 150%, and 200% of current allocations. In addition, the analysis identifies the significant role of private property forests in current and future development of the industry.

Key industry development options identified in this report include:

- increased proportions of hardwood logs being directed to value added processing - it is envisaged that value adding processing will be based on industry nodes across a number of centres in the region;
- increased utilisation of low grade logs, primarily through increased recovery from existing pulpwood resources;
- expanding production of high quality hardwood and softwood plywood and veneer, and potential production of hardwood LVL;
- potential establishment of a world scale softwood LVL plant based on available plantation resources at Walcha;
- increased woodchip exports, with possible construction of a new world scale chip mill; and
- utilisation of the current waste material through biomass energy production both in a specific mill as well as through smaller scale co-generation at specific mill sites.

There are potential synergies between these options. For instance, increased utilisation of residues would enable increased production of sawlog resources through more intensive forest management regimes.

In many regards, the upper northeast and the lower northeast RFA regions of NSW have similar characteristics. These include a relatively fragmented and diverse forest resource and a similarly fragmented and diverse wood products industry built on relatively small sawmills.

However, there are also some key differences between the wood products industries of the two regions. The **upper northeast region is unique** for reasons that include:

- there is no export port within close proximity to the largest timber catchments (Grafton is approximately 400km from Newcastle and 300km from Brisbane), a fact that limits opportunities to utilise large surplus volumes of wood residues;
- it is a focal point for hardwood plantation development in NSW, with State Forests of NSW aiming to expand the existing resource by approximately 10,000ha each year from 1997/98 into the medium term; and
- the only two plywood and veneer producers in northeast NSW are located in this region, and despite being at the lower end of world scale production, both are expanding their businesses and providing leadership in the maximum use of resources.

These key differences are significant factors in determining what industry development options are likely for either or both of the two northeast RFA regions. For the upper northeast region, it is clear that the large volume of wood from sawmill residues and pulpwood from sawlog based operations in native forests and silvicultural operations in the developing plantation estate needs to be directed to an economically viable use. Options for this include woodchip exports through a northern port, or bioenergy production. There is also the possibility of producing charcoal and activated carbon from wood residues. The Forestry and Forest Products Division of CSIRO has recently developed a process using ‘fluidised bed combustion’, and successful results have been achieved from pilot plant tests. This option is particularly attractive in northeast NSW, as it is less dependent on large volumes of resources, being based primarily on the use of sophisticated technology to extract maximum value from the resource.

It is also clear that the production of veneer based products is a focal point in the region. This existing industry derives maximum value from the available resources and makes a significant contribution to regional employment. The success of this industry provides a solid basis for future growth through expansion of veneer based manufacture. Another option for expansion is the production of long length laminated veneer lumber (LVL). Demand for this product is gradually increasing in Australia and there is currently only one producer in Australia.

Common to both northeast regions is a need to address the structural adjustment required of the hardwood sawmilling industry in light of recent reductions in resource allocations and the changing nature of the resource. This process of change has begun and with government initiatives supporting increased efficiency and value-adding operations, a new industry structure appears to be already taking shape. The most likely industry development options for the upper northeast region appear to be:

- increase value adding in hardwood sawmilling through development of value adding processor ‘nodes’;
- woodchip exports through northern port;
- world scale hardwood LVL production;
- bioenergy production; and
- charcoal and activated carbon production.

The **lower northeast region is unique** for reasons that include:

- there is existing infrastructure to enable commercial use of woodchips, primarily through the export port near Newcastle and the hardboard production facility at Raymond Terrace;
- the softwood estate at Walcha provides a relatively large, consolidated wood resource, most of which is not committed to any processing facility at this time;
- there are no plywood or veneer-based product producers in the region, and the available veneer resources, albeit relatively small, are not sent to the upper northeast processors on account of prohibitive haulage costs.

As is the case in the upper northeast region, structural adjustment is occurring due to recent reductions in resource allocations and it is expected that the hardwood sawmilling industry will continue to develop through value adding nodes. There is also the potential to increase woodchip exports through the port of Newcastle.

Another key issue in the region is the utilisation of the Walcha softwood resource. This resource could provide for world scale softwood LVL production. It could also provide resources for bioenergy production, which can be economically viable on a range of scales, thereby providing an opportunity for an integrated processing facility. The variable quality of the Walcha resource and its distance from other industrial centres encourage options that can utilise all grades and dimensions of wood resources.

The most likely industry development options for the lower northeast region appear to be:

- increase flows to value-adding processor ‘nodes’;

- increase woodchip exports through Newcastle;
- centralised softwood LVL production;
- bioenergy production; and
- charcoal and activated carbon production.

PART 1:

BACKGROUND REPORT

1. INTRODUCTION

This report is part of a study commissioned by the Australian Bureau of Agricultural and Resource Economics (ABARE) to investigate industry development options for the regional forest agreement (RFA) regions of upper and lower northeast NSW. This study will identify viable options for industry development, which will form the basis for input to the FORUM economic model developed by ABARE. The FORUM model will illustrate the economic benefits from the fulfilment of industry development options, or alternatively, the economic costs of resource scenarios that do not allow these developments to be realised.

The combined upper and lower northeast RFA regions are approximately bounded by the Hawkesbury River to the south, the New England Highway to the west, the Queensland border to the north and the east coast. In June 1998, there were approximately 25 large sawmills (>10,000m^3 per year) relying on crown and private resource, two veneer mills, two handle manufacturers, several pole, pile and girder producers, a dedicated woodchip mill, an export woodchip facility and a hardboard plant within the two regions.

In addition to the large sawmills, there are approximately 270 smaller mills with an annual intake of less than 10,000 m^3. This relatively large number of small sawmillers is indicative of several key characteristics of the forest industry in northeast NSW. These include:

- industry use of a large range of species (approximately 30, with about 10 main species);
- the mix of species is in a state of flux due to resource changes;
- production of a diverse range of forest products including green hardwood and softwood sawntimber, dried and dressed hardwood sawntimber for flooring and decking, softwood plywood, hardwood veneer and plywood, hardboard, hardwood poles, woodchips, beams, parquetry, pallet production, wall panelling, and tool handles;
- a traditionally strong focus on green sawntimber production, though in recent years several companies have significantly diversified their product range;
- structural adjustment occurring in both regions being driven by resource reductions, growing importance of regrowth forests, as well as market based competitive factors;
- markets for residues in areas not within economic haulage distance of Newcastle and Brisbane are limited; and
- there is only one major export port in use (Newcastle), although Brisbane has been used in the past.

Options for the further development of existing industries and the establishment of world scale new industries are assessed in this report. This includes consideration of:

- existing and potential forest resource availability;
- existing industry structure and factors within the evolution of this structure;
- competitiveness of existing wood product producers in regional, national and international markets; and

- existing and potential market opportunities for wood products from these two regions.

As part of this study a workshop involving industry participants was convened to discuss industry development options and relevant factors. This workshop made it very clear that current forest industry participants foresee a range of market development opportunities in both regions. Participants in the workshop emphasised the vital importance of expanding resource supplies to expand the economic impact of the forest industries in both regions. The resource issue is dealt with in Chapter 2. Other issues raised at the workshop (eg, factors relevant to promoting industry development) are dealt with in other sections. A strategic assessment of selected industry development options is provided in Parts 2 and 3 of the study.

2. WOOD RESOURCES

2.1 NATIVE FOREST

2.1.1 Forest areas and types

The public and private forests within the two northeast RFA regions are shown in the map at Annex 1. There is approximately 1.5 million ha of hardwood forests, including some 45,000 ha of hardwood plantations and 22,000 ha of softwood plantations. The most common hardwood species processed as sawlogs and their properties are detailed in Table 2a.

TABLE 2A: PRINCIPAL COMMERCIAL HARDWOOD TIMBERS IN NSW

Species	Indicative % by volume from Crown Land 1996/97	Colour	Specific Gravity (1)	Hardness (2)	Durability Class (3)
Black butt	22	Light brown	900	8.9	2
Spotted Gum	14	Light to dark brown	1100	10.1	2
Blue Gum	6	Pink to red	850	8.1	3
New England B/butt	5	Light brown	850	9.2	2
Messmate	4	Light brown	750	7.4	2
Tallowwood	4	Yellow-brown	1000	8.6	1
Brush Box	4	Pinkish-brown	900	9.1	3
Silvertop Stringy bark	3	Light brown	850	8.8	3
Flooded Gum	3	Pink to light red	750	7.3	3
Ironbark	3	Light to dark brown	1100	16.3	1
Brown Barrel	2	Light brown	750	5.5	3
Yellow Stringy bark	2	Light yellow brown	900	8.6	2
White Mahogany	2	Light yellow brown	1000	10.1	2
Silvertop Ash	2	Light brown	850	9.8	3
Turpentine	1	Red Brown	950	11.6	1
Grey Gum	1	Red	1050	14.0	1
Manna gum	1	Light pink	800	5.8	3

Source: State Forests of NSW 1998

Notes:

1. Kg/m^3 at 12% M.C.
2. Resistance to indentation (KN).
3. Resistance to decay: class 1 very durable to class 4 non-durable.

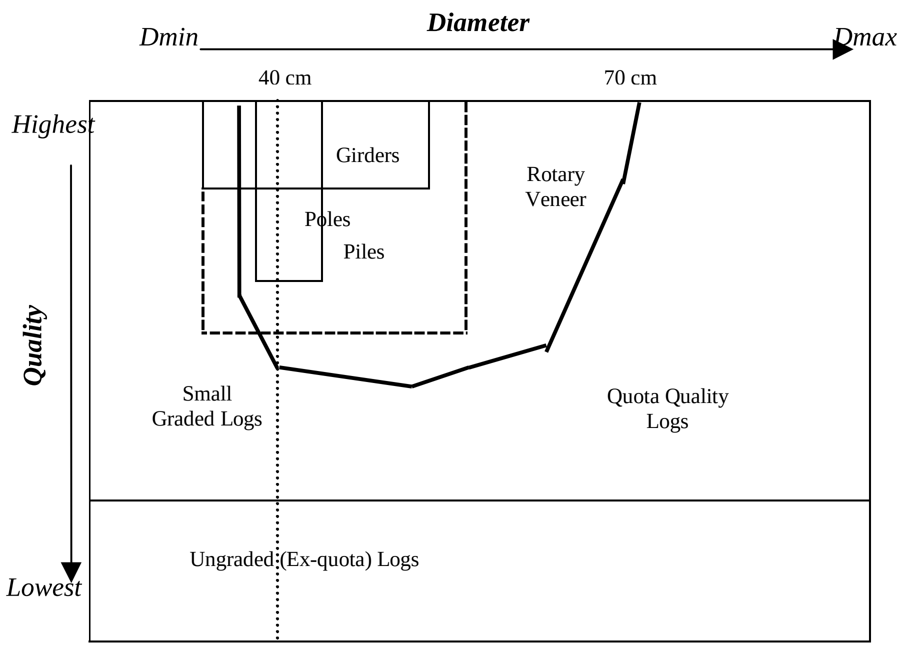
Factors determining the proportion of species harvested for wood products over time include: markets; age-class distributions; changes to resource availability; and the development of harvesting and biodiversity protocols. In 1991/92, approximately 17% of the total timber harvest was Blackbutt. This proportion increased to over 22% in 1996/97 due to the shift of harvesting operations into regrowth forests. Over the same period, and for the same reason, the proportion of Spotted Gum harvested has increased from some 8% to over 14%. The proportions of Tallowwood and Brushbox harvested for wood products have decreased, from 9% to 4% and 7% and 4% respectively, as wet sclerophyll forest areas were reserved from harvesting. The harvested proportions of Messmate, Blue Gum and Ironbark have remained relatively stable during this decade.

Forecasting the likely species mix in the future is made especially difficult by uncertainty over the availability of State forest lands, some of which are currently under extensive wilderness nominations. For example, if a large tract of State forests on the Northern Tablelands were reserved from harvesting under a wilderness listing, the proportion of New England Blackbutt harvested would decline dramatically. However, several key trends look set to continue. Harvesting activity will continue to move into regrowth stands, increasing proportions of Blackbutt and Spotted Gum, and out of wet sclerophyll forests, further decreasing supplies of species like Tallowwood and Brushbox.

2.1.2 Log classification

For the purpose of this study, the diagram below describes the log classification system used in State forests of NSW.

FIGURE 2A: LOG MODEL FOR STATE FORESTS OF NSW



‘Quota quality sawlogs’ meet or exceed quota grading standards, and are greater than 35cm small end diameter (sed), or 40cm mid-diameter. Sawlogs that meet these standards but are less than 35 cm sed (down to 20 cm sed) are called "small graded logs". Sawlogs of all sizes that do not meet quality grading standards are called "ungraded logs". Other sawlog products include veneer grade, posts, poles and girders, and their dimensions and grade are determined by the existing markets for these products.

Figure 2a illustrates how trees can provide a range of log products, and how the products available from each tree or stand can change over time with increases in diameter or decreases in log quality.

2.1.3 Timber resources

The National Forest Policy Statement (Commonwealth of Australia 1992) called for the development of a comprehensive, adequate and representative (CAR) conservation reserve system throughout the forested areas of Australia. In an effort to secure this CAR system, the NSW Government has reserved significant areas of State forest that were previously available for timber harvesting. In the upper and lower northeast RFA regions, some 118,000 ha of State forest were reserved as Wilderness areas during the Interim Assessment Process of 1996, and about 45,000 ha of State forest became National Parks (State Forests of NSW 1998). Over the past five years, there have been considerable changes to requirements for the protection of wildlife through “Conservation Protocols” and the protection of soil and water through EPA licences. These developments have also considerably reduced the operational areas for harvesting on State forest. The new protocols were developed to ensure the conservation of rare forest types, old growth forests, rainforest, threatened species and special sites, and will remain in place until the completion of the RFAs.

In June 1995, the NSW Government announced a 30% reduction in supplies of quota quality sawlogs to the native forest timber industry to bring timber harvesting back to sustainable levels following the reductions in harvestable areas. These reductions came into effect on 1 July 1996. In September 1996 the Government announced a package of reforms designed to maintain a sustainable and economically viable native forest timber industry despite the large reductions in resource availability. Previous holders of quotas for hardwood sawlogs were offered resource security for a portion of their allocations in the form of tradeable and divisible 5 + 5 year Term Agreements. Companies who traditionally received supplies of non-quota sawlogs did not receive resource security at this stage. Individual agreements are being negotiated for two companies in northeast NSW that previously held long term Wood Supply Agreements, which includes quota quality and small logs.

The Term Agreements came into effect on 1 January 1997 and were set at 50% of 1995 quota allocations. Previous holders of quotas for hardwood sawlogs were also offered additional supplies of quota quality hardwood sawlogs from 1 July 1997 for three years or until completion of the RFA, whichever is sooner. Sawmills in regions north of the Hunter River receive an additional 10% of 1995 allocations, while sawmills south of the river receive an additional 15%.

In the two northeast RFA regions, 22 Term Agreements were accepted, representing a volume of approximately 96,000 m^3 per year. Two companies, representing approximately 20,000 m^3 per year across the State, elected not to take up Term Agreements. This volume is currently being supplied under annual quota arrangements, including 4,500 m^3/year from within the two northeast RFA regions.

Term Agreements are tradeable on the open market to assist in industry rationalisation and, as of July 1998, seven trades have taken place across the State, representing some 16,000 m^3 per year. Of these trades, five have occurred between companies within the upper and lower northeast RFA regions, representing transfers of about 8,000 m^3 per year of quota quality sawlogs. The Term Agreement contracts oblige the holder or a potential purchaser to undertake a minimum level of value adding of the secured resource. Term Agreement holders are offered the opportunity to extend their five year agreement for an additional five year period provided that they undertake this minimum level of value adding.

2.1.4 Sawlog resources

The forthcoming RFAs for the upper and lower northeast NSW regions will specify totals for resource allocations over the life of the agreements (20 years). These allocations are currently unknown. To assess industry development options it is therefore necessary to consider a range of resource allocation scenarios that encompass likely outcomes. Following consultation with key stakeholders, and based on current allocations under Term Agreements and Wood Supply Agreements (approximately 60-65% of 1995 allocations), this study will assess options in the context of four resource scenarios, being current allocations and 50%, 150% and 200% of current allocations.

These resource scenarios have been included at the express request of industry participants at the workshop held as part of this study. Workshop participants felt very strongly that market prospects provided significant development opportunities for the industry if resources were made available. It was also felt that these levels of resource could be readily supplied with more intensive management of native forests available for multiple use timber production. These scenarios may represent increases in resources over time, for example, a doubling of available resources over the next 10 years. The 50% option has been included to allow illustration of the effects of further resource reductions on the regions' forest industries.

State Forests of NSW provided resource information for these five scenarios. The resources available from State forests under current allocations are shown in Table 2b.

TABLE 2B: ROUNDWOOD SUPPLY FROM STATE FORESTS AT CURRENT QUOTA ALLOCATIONS

	Upper NE		Lower NE		Total
Product ('000 m^3)	Hardwood	Softwood	Hardwood	Softwood	
Quota Quality Sawlogs[1]	159	24	139	20	342
Small Graded Sawlogs	24	50	21	60	155 [2]
Ungraded Sawlogs	88	-	76	-	164
Veneer Logs <40cm	4	15	4		21
Veneer Logs >40cm	9	8	14	-	31
Poles	14	-	3	-	17
Piles & Girders	6	-	3	-	9

Notes:
1. Quota quality (QQ) sawlog contains a range of log qualities, with three general categories described as high (veneer), medium, and low grade. The proportion of QQ sawlogs in each of these categories is, generally speaking, 10%, 60%, and 30% respectively. This means that, if desired, more veneer resource could be made available from the QQ 'basket', although this would be at the expense of QQ wood allocated for sawing. This may or may not be a worthwhile tradeoff for industry development in northeast NSW, and these decisions must consider effects on current commitments. There is no uncommitted surplus available based on these volumes.
2. If industry could sell as much pulp as it could produce, then it would become economically-viable to log some more lower quality stands. This would increase small graded sawlog volumes by 19,000m3 in the upper northeast and 30,000m3 in the lower northeast.

To assess industry development options, 'timber catchments' are used in the resource analyses. These catchments, defined in the map at Annex 1, were developed by State Forests of NSW for sustainable yield analysis. They identify areas that contain most of the timber flows within the region, ie. most wood flows take place within the zones, with only relatively small proportions crossing the boundaries. However, options developed in this study are based on the assumption that, generally speaking, drawing wood from an adjacent catchment is economically viable. For example, a potential processing facility in catchment 2 could afford to draw wood from catchments 1, 3 and the northern part of 6.

Sustainable yields from forest districts in northeast NSW were utilised prior to the Interim Assessment Process of 1995/96. Due to the uncertainty about land and forest resource availability during the subsequent RFA development process, sustainable yield levels are not currently available for the existing area allocations. Following agreement on areas available for timber harvesting, State Forests of NSW will develop sustainable yields for each timber catchment.

Supply scenarios from State forests for the different hardwood sawlog grades by timber catchment are shown in Table 2c.

TABLE 2C: SUPPLY SCENARIOS FOR QUOTA HARDWOOD SAWLOGS FROM EACH TIMBER CATCHMENT

Timber catchment	Volume ('000 m^3) p.a. of quota quality sawlogs produced as proportion of current allocations redistributed pro rata to State Forests of NSW's 1997 Timber Distribution Strategy			
	50%	**Current**	**150%**	**200%**
TC 1	23	47	70	94
TC 2	56	112	168	224
UNE	79	159	238	318
TC 3	39	77	116	154
TC 4	16	32	48	64
TC 5	3	6	9	12
TC 6	12	24	36	48
LNE	70	139	209	278
Total	**150**	**298**	**447**	**596**

Small graded and ungraded logs are generated in the course of quota log production, roughly in the proportions of 15% and 55% of quota log volume respectively. In accordance with these proportions, supply scenarios for these products are specified in Tables 2d and 2e. It is important to note that the distinction between ungraded logs and pulpwood is uncertain and will be determined by market forces.

TABLE 2D: SUPPLY SCENARIOS FOR SMALL GRADED HARDWOOD SAWLOGS

Timber Catchment	Estimated volumes ('000 m^3) p.a. of small graded sawlogs produced as by-product of quota allocations			
	50%	**Current**	**150%**	**200%**
TC 1	3	7	10	14
TC 2	9	17	26	34
UNE	12	24	36	48
TC 3	6	11	16	22
TC 4	2	5	8	10
TC 5	1	1	2	2
TC 6	2	4	6	8
LNE	11	21	32	42
Total	**23**	**45**	**68**	**90**

TABLE 2E: SUPPLY SCENARIOS FOR UNGRADED HARDWOOD SAWLOGS

Timber Catchment	Estimated volumes ('000 m^3) p.a. of ungraded sawlogs produced as by-product of quota allocations			
	50%	**Current**	**150%**	**200%**
TC 1	13	26	39	52
TC 2	31	62	93	124
UNE	44	88	132	176
TC 3	21	42	63	84
TC 4	9	17	26	34
TC 5	2	4	6	8
TC 6	6	13	19	26
LNE	38	76	114	152
Total	**82**	**164**	**246**	**328**

In addition to the State forests resource, **private forests** are currently providing about 180,000 m3 of sawlogs in the upper northeast region and in the order of 70,000 m^3 of sawlogs in the lower northeast region (Northern NSW Forestry Services 1994, 1996).

Veneer, poles, piles and girders are sawlog products that are removed almost independently of quota sawlog production. In consideration of sawlog supply scenarios, it is important to remember that products growing in the forest can and do change into different products over time (see Figure 2a). Tall, straight stems may be cut for poles if there is a good market for poles at that time. If not, the stem may be left to grow into a more valuable quota quality sawlog, or harvested for pulpwood to allow adjacent trees to develop into higher quality logs. From this position, Table 2f provides estimated volumes of veneer, poles and piles based on 1998 allocations.

TABLE 2F: SUPPLY SCENARIOS FOR VENEER LOGS, POLES AND PILES

Timber Catchments	Estimated Volumes ('000 m^3) p.a.			
	Veneer <40cm	**Veneer >40cm**	**Poles**	**Piles / Girders**
TC 1	1	2	5	3
TC 2	3	7	9	3
UNE	4	9	14	6
TC 3	4	7	2	2
TC 4	-	2	-	-
TC 5	-	1	-	1
TC 6	-	3	-	-
LNE	4	13	3	3
Total	**8**	**22**	**17**	**9**

2.1.5 Residual logs

Residual, or pulpwood, logs are generated from regrowth thinnings and as a by-product of integrated harvesting operations. Sawlog production is often dependent on pulpwood markets to ensure economic viability of the silvicultural operations designed to maximise returns from sawlogs. Though annual volumes will vary considerably, pulpwood volumes are estimated for the forthcoming RFA period (Table 2g).

TABLE 2G: SUPPLY SCENARIOS FOR HARDWOOD PULPWOOD FROM EACH TIMBER CATCHMENT

Timber Catchment	Estimated volumes ('000 tonnes p.a.) of hardwood pulplog produced by thinnings and by-product of proportion of current allocation				Plantations	
	50%	**Current**	**150%**	**200%**	**2000-2010**	**2010-2020**
TC 1	43	67	90	114	3	140
TC 2	121	177	233	289	40	70
UNE	164	244	323	403	43	210
TC 3	109	147	186	224	72	70
TC 4	16	32	48	64	5	7
TC 5	14	17	20	23	6	7
TC 6	12	24	36	48	-	-
LNE	151	220	290	359	83	84
Total	**315**	**464**	**613**	**762**	**126**	**294**

Source: State Forests of NSW (1998)

Notes:

1. Pulpwood estimates assume 1 green tonne of pulpwood is produced per $1m^3$ of quota sawlog in integrated harvesting operations, plus pulplog derived from regrowth thinning operations.
2. Pulpwood volumes should increase with increased thinning of regrowth stands through the latter half of the RFA period. State Forests of NSW estimate that TC3 and TC6 may yield in excess of an extra $20{,}000m^3$ per year from regrowth thinning of native forests between 2010 and 2020.

In addition to the pulpwood volumes, wood residues are generated by various processing operations in the forest industry. Significant residue volumes created by harvesting operations are currently left in the forest as there is no market for this product that can justify its extraction.

Sawmill chips and sawdust are other wood residues available to the industry. While some volumes are currently converted to provide economic returns, there is potential to increase these returns. Table 2h provides estimated hardwood residue and pulpwood volumes, based on the current resource allocations scenario, which could potentially be harnessed during the forthcoming RFA period for value adding or cost saving applications, such as reconstituted panel products or fuel for bioenergy.

TABLE 2H: ESTIMATED HARDWOOD RESIDUES FROM NORTHEAST NSW ('000 TONNES)

Timber catchment	Pulpwood (NF)	Pulpwood (PLTN)	Pulpwood (PP[1])	Sawmill Chips[2]	Other forest residues[3] (SF)	Sawdust[4]	Total ('000 tonnes)
TC 1	67	3	121	32	17	20	260
TC 2	177	40	100	76	44	48	485
UNE	244	43	221	108	61	68	745
TC 3	147	72	26	52	37	33	367
TC 4	32	5	20	22	8	14	101
TC 5	17	6	20	4	4	3	54
TC 6	24	-	20	16	6	10	76
LNE	220	83	86	94	55	60	598
Total	**464**	**126**	**307**	**202**	**116**	**128**	1343

Notes:

1. Private Property pulpwood calculation based on the proportions of pulpwood generated by sawlog production on State forests. The breakdowns of volumes by timber catchment are estimates for use in strategic analyses only.
2. Woodchips, particularly from sawmills, may not meet export quality standards.
3. Sawmill chip calculation based on 0.4 tonnes per m^3 of log sawn
4. Sawdust calculation based on 0.25 tonnes per m^3 of log sawn

2.1.6 Specialty timbers

The northeast NSW forests provide some unique timbers that have and continue to be used for special applications. Table 2a shows that there are several species that meet Durability Class 1 standards, and others that are valued for exceptional colour and hardness characteristics. Tallowwood, for example, is regarded as an excellent timber for decking and heavy structural applications where its durability, strength and hardness provide a competitive advantage. The pink and red shades of Rose (or Flooded) Gum, Sydney Blue Gum, and Red Mahogany are highly prized timbers for interior panels.

The forest industry is well aware of the unique properties of these species (NSWFPA 1996), and strives to generate the greatest value from the supplies they receive. However, these species are usually supplied in mixed quota or non-quota parcels, and there are no processors based solely on substantial parcels of specialty timbers.

2.2 PLANTATIONS

In the upper and lower northeast regions, there are approximately 45,000 ha of hardwood plantations, including post 1994 joint venture plantings, and 21,000 ha of softwood plantations. Most of these plantation resources are owned and managed by State Forests, although there is increasing interest in joint venture agreements between the State Government and private land owners.

The hardwood plantation resource comprises *Eucalyptus pilularis* and *E. grandis* and smaller areas of other species. The earliest significant areas were established in the 1950s. Approximately 25,000 ha of the existing estate is currently more than 10 years old at this time. From 1998 into the medium term, State Forests of NSW plans to establish up to 10,000 ha of hardwood plantations per year under joint venture agreements and other arrangements (State

Forests of NSW 1997). This establishment plan would create a north coast estate in excess of 100,000 ha by the mid point of the forthcoming RFAs.

The softwood resource is comprised of about 11,000 ha along the north coast, consisting primarily of *Pinus elliotti*, *P. taeda* and Araucaria sp., and approximately 11,000 ha of *P. radiata* at Walcha on the Northern Tablelands. There is currently no harvesting in the Walcha estate, and no commitments on the resource. State Forests of NSW plans to establish around 500 ha per year of softwood plantations over the same period. Table 2i shows the estimated wood flows from plantation in the RFA regions.

TABLE 2I: ESTIMATED WOOD VOLUMES FROM PLANTATIONS IN NORTHEAST NSW

	Hardwood		Softwood	
('000 m^3)	Sawlog	Pulplog	Sawlog	Pulplog
2000-2010	40	90	250	90
2000 committed	40	125	170	-
2010-2020	120	294	250	90
2010 committed	*	*	170	-

Source: State Forests of NSW 1998 * unspecified.

3. PROFILE OF EXISTING INDUSTRIES

3.1 INTRODUCTION

The timber industry in the RFA regions is diverse. It includes the processing of sawlogs and pulpwood and the utilisation of processed timbers obtained from native hardwood forests and exotic softwood plantations. A study of the structure and economic impacts of the NSW forests products industry (State Forests of NSW 1995) identified the forest industries as an important contributor to the State and regional economies. While this study examined regional contributions, the boundaries of the statistical divisions used as the basis for estimates are different to the RFA region boundaries. However, an approximation of the contribution the forest industries make to the economy in each of the northeast RFA regions has been derived based on the following assumptions:

- the Richmond-Tweed, Mid North Coast, Northern and Hunter statistical districts roughly equate to the two RFA regions;
- the contribution that the native forest and plantation industries make to the total industry output, added value, income and employment in each of the four statistical districts is proportional to the total volume of hardwood and softwood (excluding cypress pine) logs produced; and
- the contribution of imported timber to the fabrication component in each of the four statistical districts is negligible.

Based on these assumptions, Table 3a provides estimates of the direct economic impact in 1993/94 of the hardwood and softwood sectors in the upper and lower northeast RFA regions.

TABLE 3A: ECONOMIC IMPACT OF THE FOREST INDUSTRY IN THE NORTHEAST RFA REGIONS - 1993/94

Statistical Area	Resource	Economic Parameters			
		Output $'000	Value Added $'000	Income $'000	Employment
Rich-Tweed	Hardwood Softwood	48,087 20,218	30,311 2,745	15,240 6,484	661 227
Mid North Central	Hardwood Softwood	134,209 -	89,523 -	34,052 -	1,868 -
Northern	Hardwood Softwood	30,186 1,661	11,902 655	13,194 726	501 28
Hunter	Hardwood Softwood	133,053 -	74,222 -	33,073 -	1,061 -
Both RFAs	Hardwood Softwood	345,535 21,879	205,958 3,400	95,559 7,210	4,091 255
	Total	367,414	209,358	102,769	4,346

Source: State Forests of NSW 1995

These estimates suggest that the regions account for about 20% of the direct economic impacts of the forest products industry in NSW and about 40% of the direct economic impacts of the industry in rural areas.

Notwithstanding the effects of recent reductions in log allocations, the native hardwood forests make a vital contribution to the economies of both northeast RFA regions. Hardwood sawmilling is the largest forest industry in both regions. The presence of the hardboard manufacturing plant in the Hunter statistical district is reflected in the relatively high value of the output for that district.

3.2 LOG PRODUCTION

The native forests and plantations in the upper and lower northeast RFA regions supply a range of products including sawlogs, veneer logs, poles, piles, railway sleepers, pulpwood for manufacturing hardboard and woodchips, fencing timber, mining timber and firewood. The quantities of products obtained from State forests of NSW in the last three years are detailed in Table 3b.

TABLE 3B: TIMBER YIELDS FROM STATE FORESTS OF NSW – 1995-1998

Timber catchment	Product	1995/96	1996/97	1997/98
1	High grade > 40cm	85,943	70,300	66,530
	High grade < 40cm	16,052	18,060	17,206
	Low grade	28,400	32,944	22,828
2	High grade > 40cm	110,332	92,967	72,979
	High grade < 40cm	12,898	16,909	21,230
	Low grade	54,760	53,629	47,604
3	High grade > 40cm	104,647	91,447	82,984
	High grade < 40cm	11,847	12,377	11,151
	Low grade	72,265	82,670	56,628
4	High grade > 40cm	68,842	56,858	29,834
	High grade < 40cm	6,757	3,959	3,184
	Low grade	48,441	85,494	30,710
5	High grade > 40cm	9,838	7,586	11,952
	High grade < 40cm	227	1,174	1,324
	Low grade	45,733	35,334	47,995
6	High grade > 40cm	44,436	35,568	27,321
	High grade < 40cm	971	1,102	1,294
	Low grade	101,247	11,445	4,025

Source: State Forests of NSW 1998

3.3 HARVESTING AND LOG TRANSPORT

The harvesting and haulage sector of the northeast NSW forest industry is characterised by family-owned businesses that provide stump to mill operations. These businesses are often loosely associated with one large mill customer and a few smaller customers. In this arrangement, the forest owner has no direct control over harvesting and haulage contractors.

Selective logging techniques are employed in the native forests. In accordance with harvesting protocols, neither clear felling nor group selection is utilised in northeast NSW. Almost all harvesting operations incorporate motor manual falling, snigging with tractors and skidders, and debarking/loading with tractors or excavators. In comparison with other states, harvesting operations in northeast NSW utilise older equipment. While there is an increasing number of excavators in operation, bulldozers are used by some operators to break out logs. Many operations still use snigging chains rather than grapples.

Most haulage operations utilise standard trucks and trailers with dual or tri-axle jinkers. B-doubles are not used, except to and from Walcha, because they are not permitted on the Pacific Highway north of Bulahdelah. It is expected that the Bulahdelah bypass will be completed by mid 1999, which would allow B-doubles to run between Newcastle and South Kempsey. Most operations handle about 10-15,000 m^3 per year with a crew of 2-4 men, and operate one or two trucks. The exception is the Greensill Company, which operates some 15 trucks across the northeast region, though even this number is small compared with industries in other states and abroad.

The current industry structure of the logging and haulage industry suggests that, with appropriate security to justify new investments, there may be scope to reduce operating costs and environmental impacts. This structure reflects uncertainty over resource access for the regions' forest industries. For instance, for reasons including their own lack of resource security, mills have generally been unwilling to provide harvesting and haulage contractors long term contracts for supplies of substantial volumes.

Most harvesting and haulage rates used in the industry are based on the logging rates prepared by the NSW Forest Products Association and the NSW Logging Association. The rates have been derived using modelled costs of three types of operations working in three classes of difficulty. Based on these modelled scenarios and the underlying assumptions, the current cost of most falling and snigging generally lies in the range of \$19 - 27/m^3, with an average close to \$21/m^3. Haulage distance and road classes are critical variables contributing to haulage costs. For strategic analysis of production costs, State Forests of NSW (1998) use a rate of approximately 10 cents per m^3 per km for traditional truck haulage, with discounts for rail (8.5 cents/m^3/km) and B-double trucks (6.5 cents/m^3/km).

3.3.1 Log merchandising

State Forests of NSW has recently embarked on an initiative designed to simplify the coordination of harvesting and haulage, reduce delivered wood costs, and encourage capital investment in technology and training. Under the “log merchandising” scheme, State Forests engages harvesting and or haulage contractors to harvest and deliver logs to mills. This gives the agency responsibility for the resource security provided to these contractors. The log merchandising scheme was introduced on 1 July 1997, and is only in operation on the north coast at this stage. State Forests have provided contractors under the new scheme with guaranteed wood flows, with contract periods ranging from 2 + 2 years to 5 + 5 years. This security has already generated capital investment in equipment, including the introduction of excavators on log dumps and feller bunchers. There is also evidence of greater log segregation in operations since the inception of the scheme (State Forests of NSW 1998). One key objective of log merchandising is to replace State Forests log graders with trained and accredited private log graders.

The implications of the log merchandising in the upper and lower northeast regions are:

- a shift towards fewer, bigger harvesting and/or hauling contractors with more specially trained personnel; and
- an expected gradual decrease in delivered wood prices of up to 10 to 20%, with savings principally from harvesting efficiencies achieved through greater coordination of operations, higher productivity from modern equipment, and the benefits from utilising well trained staff.

3.4 HARDWOOD SAWMILLING

Boral Timber is the largest hardwood sawmilling company in NSW and in both the upper and lower northeast RFA regions. This company's allocations from State Forests of NSW total approximately 60% of the total quota log volume throughout the two study areas. The remaining quota resource is distributed amongst some 22 small to mid sized processors located throughout the study area (Table 3c).

TABLE 3C: NUMBER OF SAWMILLS RECEIVING WOOD FROM STATE FORESTS IN NORTHEAST NSW

m^3 per year	<1,000	1,000-9,999	10 -30,000	>30,000	Total
Upper NE	28	19	8	0	55
Lower NE	43	24	14	3	84

Source: ABARE 1998b: excludes value-adding processing facilities

The total number of sawmills in the two northeast regions is close to 300 (upper northeast – 145, lower northeast – 152). Most of these sawmills receive less than 10,000 m^3. Many of the small to medium sawmills rely upon private property resources to supplement non-quota resources from State forests. There is no contractual supply security associated with private property and non-quota resources. As a result, these sawmillers are reluctant to invest capital to reduce expenses, such as by replacing and maintaining equipment, training employees, or improving occupational health and safety standards. Over the longer-term, the neglect of these activities will be to the detriment of the small scale sawmilling industry.

While exact volumes are not known at this time, it is clear that across both regions more sawn product is now being turned toward higher value end uses through the installation of value adding facilities. Several mills also have plans to undertake such investment in the near future. Processors with value adding facilities include Boral (Kyogle, Maxwells Creek, Herons Creek, Murwillumbah), Richards Milling Co. (Wyan), Hurfords (Lismore), East Coast Timbers (Grafton), Notaras (South Grafton), Coffs Harbour Hardwoods (Glenreagh), Kempsey Timbers (Kempsey), and Fenning Timbers (Gloucester). Whilst the volume of quota resource going to companies with some form of value adding facility is 75-80% of the total quota volume harvested, the number of individual companies with some form of value adding facility is less than 40%. Companies without these facilities onsell a significant proportion of timber to the value adding processors. These estimates are based on industry observations and discussions. Table 3d provides estimates of the proportion of logs from different sources that are currently used in value added processing.

TABLE 3D: ESTIMATED PROPORTIONS OF LOG INPUTS UTILISED IN VALUE ADDED PROCESSING

Product source	% VA	Total log inputs	Volume (m^3)
Quota logs	55%	298,000	151,000
Small logs	60%	45,000	24,000
Ex quota	10%	164,000	15,000
Veneer	100%	30,000	30,000
Pole Products	100%	17,000	17,000
Piles and Girders	100%	9,000	9,000
Total value of current value adding	47%	563,000	263,000

This value adding percentage of about 45% could also be applied to the **private property** resource to give about 115,000 m^3 of logs going into value added products.

These figures suggest that the greatest scope for new value adding investment lies with the ungraded low quality log market which, through mechanisms such as glue laminating small end section material and manufacturing furniture components and parquetry, affords the opportunity to lift the returns from a base price to a high value price in line with that of boards or better.

A number of mills in the regions process small graded logs and ungraded low quality logs. Some of these processors rely solely on this resource whereas some utilise it in conjunction with their quota resource. A number of small log and ex-quota log processors have made significant investments in plant and equipment, including value adding plant to lift the returns from this small and/or low quality resource.

Small logs are generated from operations in native forests and plantations. The plantation component of the annual volume is anticipated to remain reasonably static, at least for the first half of the study period, whereas the native forest supply will be subject to activity fluctuations in the quota operations and regrowth thinning operations. The ex-quota volume is produced from quota operations and as such will fluctuate in line with quota harvesting activity.

3.5 POLES, PILES, GIRDERS

The northeast NSW region is a major supplier of Australian treated poles to the eastern states and more recently, Southeast Asian countries. Four pole suppliers currently operate in the study area. However, there has been a marked decline in the sales of poles, piles and girders from the study area over the last five years. Volumes have decreased from around 50,000m^3 in 1993 to around 25,000 m^3 in 1998. Removals of poles and piles in Australia have decreased from 136,000 m^3 in 1991/92 to 45,000 m^3 in 1996/97 (ABARE 1998). The wood resources available to NSW suppliers have been significantly reduced by the Interim Assessment Process, with large areas of optimal regrowth stands in the upper northeast currently reserved in Interim Deferred Forest Areas. In addition, the pole market is facing stiff competition from both substitute products (e.g. concrete and steel) as well as better maintenance practices by power distributors which are extending the lives of existing poles well beyond traditional life expectancy. A further limiting factor on the growth of the pole market is the trend towards underground power in new subdivisions.

There is strong export demand for Australian poles, particularly in southeast Asia, and only the resources available limit the sales of local suppliers. Existing capacity appears to be sufficient to meet increases in domestic and international demand if the wood resources are available.

3.6 SOFTWOOD SAWMILLING

There is a small but active softwood sawmilling industry within the study area, based largely in the upper northeast. State Forests has advised that the softwood plantation estate within the study area will be expanded by 5000 ha over the next ten years. This should ensure that existing levels of softwood processing are maintained throughout the study period.

Several mills in the regions have made considerable capital investments in sawing and processing technology designed specifically for plantation softwood logs. The present industry has an extremely good history of utilisation of the softwood resource. The current small end diameter (sed) of sawlogs is 15 cm and that of veneer is 20 cm. With the equipment being installed it is expected that the sawlog sed will reduce to about 10 cm for sawlogs and to 15 cm for veneer (State Forests of NSW 1998).

In 1996, State Forests of NSW invited Expressions of Interest for the purchase of 80,000m^3 of sawlogs and 80,000m^3 of pulpwood from its *Pinus radiata* plantations near Walcha. The volume was offered as available for up to ten years with the option to negotiate a rollover for up to a further ten years. After the ten year period a similar volume would continue to be available but the proportion of sawlog would increase.

The outcome of the tendering process was that the combination of the relatively small volume available and the lack of a market for the residual wood stood in the way of an industry establishing in the area (State Forests of NSW 1998). This problem is exacerbated by the distance between Walcha-Nundle and other processing sites or export ports.

3.7 ENGINEERED WOOD PRODUCTS

There is only one hardwood veneer producer in the study area, located near Grafton. The company makes a range of plywood and other veneer based products for the domestic and export markets. The recent reductions in hardwood log availability has forced a shift to increasing softwood use in the finished plywood products. The company utilises both hardwood and softwood logs to manufacture its products for domestic and international markets.

The only major producer of softwood veneers in the study area is situated at Kyogle in the north of the study area. The company utilises plantation softwoods to manufacture a range of plywood products and short length laminated veneer lumber (LVL) for the domestic market.

There is a hardboard plant situated at Raymond Terrace in the south of the lower northeast region. This operation utilises sawmill residues in the form of chips for the production of its product and has traditionally taken a range of species. The operation’s future is unclear since expressions of interest were called for its disposal some time ago. The existing owners subsequently decided to retain the plant and it is currently operating. The future of hardboard as a product is uncertain with domestic sales stable or declining.

3.8 RESIDUE UTILISATION

A lack of sufficient markets has limited the economic utilisation of wood residues in both RFA regions for many years. Without sufficient markets for residues, the cost of generating and disposing of these by-products can negate the value of the primary sawlog harvesting operation. With sufficient markets, the sale of residues can enhance the sawlog resource by enabling access to resources that would otherwise be too marginal for any form of utilisation.

The major markets at present are export woodchips through the port of Newcastle and the hardboard plant at Raymond Terrace. Both of these facilities are at the southern end of the lower north east region, which limits the viability of marketing residues from the upper northeast region.

3.8.1 Export woodchips

There is one export woodchip facility within the study area This is located at Kooragang Island, near Newcastle. It currently exports approximately 200,000 tonnes per year of pulpwood quality chip, principally to customers in Japan. The larger proportion of this resource is sawmill residues. Additional supplies are from sawlog harvesting, plantation and regrowth thinning operations within the study area.

A key factor affecting competitiveness of the woodchip industry is the cost of transport to ports. The sole export port of Newcastle is close to the southern extremity of the study area. Transport costs therefore tend to limit the volume of pulpwood drawn from the upper northeast RFA area. Economically viable haulage distances vary with chipwood quality and market prices, but the upper limit is generally about 300-350 km. Woodchips from forest residues have to be chipped at a separate facility prior to delivery to Kooragang and therefore incur a double handling mobile cost. These chips can be delivered to port from the upper end of the haulage distance range, because the weight to volume ratio is increased by pre-chipping.

The opportunity to export woodchips from other ports along the North Coast of NSW would obviously decrease transportation costs from some areas. The port of Brisbane has been utilised for exporting woodchips. One option is to build another port at a strategic point on the coast between Newcastle and Brisbane to handle a range of forest products, including pulp, pulpwood and woodchips, as well as other industry commodities.

3.8.2 Pulp and paper

There is currently no industrial pulp or paper production in either of the northeast RFA regions. The feasibility of establishing pulp and/or paper production facilities has been addressed on more than one occasion. In the late 1950s, the then Australian Paper Manufacturers purchased 16,500 ha of land in the Coffs Harbour/Urunga area with the intention of establishing hardwood plantations for feedstock for a proposed pulpmill. From 1960 to the late 1970s, approximately 6,400 ha of eucalypt plantations were established. Despite this investment in resources, the pulpmill was never built, and most of the plantations were sold to the then Forestry Commission of NSW in 1983/84 (Northern NSW Forestry Services 1994). The Grafton Business Action Group has recently commissioned a study of the viability of a pulp and/or paper manufacturing plant for the Clarence Valley in the upper northeast region. The results of this consultancy are expected by the end of 1998.

3.8.3 Bioenergy production

Apart from the use of residues in some kiln drying facilities, there is currently no significant production of energy from wood residues in either of the northeast RFA regions. The Sustainable Energy Development Authority (SEDA) of NSW has commissioned a review of technology available for bioenergy production and potential sites for this industry across the State. This review will focus on the wood residues generated and potentially available from public forests and private property, and the economic returns from harvesting and utilising these residues for bioenergy. The consultancy is expected to be completed by December 1998, and should provide detailed guidance on this industry development option.

4. FOREST PRODUCT MARKET OPPORTUNITIES

4.1 INTRODUCTION

The current structure of the forest industry in the upper and lower northeast RFA regions reflects the relatively fragmented and diverse nature of the forest resources in both regions. Recent resource and market driven changes are impacting on the structure of the forest industries in the regions. The exact nature of the industry will be determined in the market place but it is generally expected that the number of processing operations will reduce, and the level of value adding will increase. As already mentioned, an industry workshop held as part of this study reflected the view that there are significant opportunities for the forest industries in both regions to expand. However, increasing the level of resources available was seen as a vital component of industry development to expand the economic impacts of the industry. The aim in this chapter is to outline the types of industry developments that could be expected if a progressive environment can be developed. The options outlined in this chapter form the basis of more detailed consideration of industry development options outlined for each RFA region in Parts 2 and 3.

4.2 SAWNTIMBER

The demand for sawntimber (and other solid wood and reconstituted panel products) in Australia is driven largely by the housing industry. Estimated sawntimber consumption by end use category is summarised in Table 4a.

TABLE 4A: AUSTRALIAN SAWNTIMBER CONSUMPTION BY END USE – 1996

End Use	Proportion (%)
Detached Housing	39
Multi-Unit Dwellings	7
Renovations	25
Non-residential	10
Furniture	9
Other	10

Source: Neufeld 1997

The underlying demand for housing in Australia has been estimated to be 138,000 dwellings per year for the period 1995/96 to 1999/2000. NSW and Queensland are expected to account for about 57% of the total housing demand (Indicative Planning Council 1996), with most housing demand occurring in the area between Sydney and southeast Queensland. As such, the forest industry in northeast NSW is very well placed in terms of end product markets. The housing construction industry is subject to cyclical expansions and contractions. Recent projections by BIS Shrapnel forecast 144,000 and 159,000 dwelling commencements in 1997/98 and 1998/99 respectively with a downturn expected thereafter (Neufeld 1997).

Australia has traditionally met its requirements for sawntimber through a combination of local production and imports. Most sawntimber imported into Australia comes from New Zealand, Canada and the United States in the case of softwood, and from Malaysia in the case of hardwood (ABARE 1998). Although Australia's apparent consumption of sawntimber has not grown over the last five years, domestic production has increased and imports have declined. Sawn hardwood production has stayed relatively constant, gaining market share from imports while losing market share to plantation softwood in applications such as house framing. Table 4b illustrates that Australia's imports of sawntimber declined from about 29% to 19% of apparent consumption over the five years from 1991/92 and 1996/97 while domestic production of plantation softwood increased by some 35% over the same period. However, Australia remains a significant net importer of sawntimber and Australian producers have the opportunity for further growth through continued import replacement and increased exports.

TABLE 4B: APPARENT CONSUMPTION OF SAWNTIMBER IN AUSTRALIA

Source		**Financial Year**	
		1991/92	**1996/97**
Domestic Production			
Native Forests	('000 m^3)	1,449.6	1,434.4
Plantations	('000 m^3)	1,446.2	1,955.2
Imports	('000 m^3)	1,193.1	756.4
Exports	('000 m^3)	26.7	60.1
Apparent consumption	('000 m^3)	4,062.2	4,085.9

Source: ABARE 1993, 1998

The expanded domestic production of sawntimber has been due to the increased availability of sawlogs from softwood plantations and the capacity of hardwood producers to develop new markets and maintain overall market share despite the loss of some traditional markets to plantation softwood. The development of new markets for hardwood has been closely associated with the expansion of kiln drying facilities and increased prices for imported timber since 1993/94. Kiln dried hardwood is able to compete with imported softwood in structural applications and with imported tropical hardwoods in appearance applications. Australian production of native forest hardwood has remained relatively constant at about 1.4 to 1.5 million m^3 per year over the last five years (ABARE 1993, 1998).

In addition to replacing imports native forest hardwood has played a significant role in expanding Australia's exports of sawntimber which have more than doubled over the last five years. In 1996/97 hardwood accounted for about 55% of the volume and 70% of the value of Australia's sawntimber exports (ABARE 1998), but total volumes are still relatively small.

Increased value adding goes beyond kiln drying sawntimber. In fact, the largest area for scope is the use of small section green hardwood timbers for high value applications (see Table 3d). This includes the development of small clear grades, such as glu-laminated and finger jointed products, parquetry, furniture components and end matched flooring. Appearance grade beams, window sections, laminated blanks for stairways are all products that obtain prices in excess of \$1000/m^3 and can be made from small sections. Advances in this area will enable the wood products industry to maximise its use of smaller regrowth and plantation timbers, and minimise the losses (to the industry and the wider community) associated with shift from older native forests.

A good example of this transformation in structural applications is the use of 'stresslam' for timber bridge construction in NSW. The stresslam system comprises small section timber boards laminated together with steel rods, essentially forming a single slab of timber up to 11x5 metres in dimension. The stresslam bridge is currently being tested in NSW. Capable of carrying full highway loads, it can provide a relatively lightweight deck which is built over the existing structure, resulting in considerable savings, both in monetary and ecological terms (Austim Pty Ltd 1997). This system appears to offer an affordable and desirable opportunity to replace the five thousand or so old degraded traditional girder and spiked plank bridges across NSW.

Provided that Australian producers can increase their competitiveness they should be able to take advantage of increasing supplies of plantation softwood and the superior properties of native hardwoods such as the strength, durability, appearance and hardness, and increase the economic and social benefits from Australia's sawntimber industries.

Table 4c shows that the situation for NSW is somewhat different to that for Australia as a whole. In particular, while production of plantation softwood sawntimber has increased since 1991/92, production of hardwood sawntimber and imports of sawntimber have declined sharply.

TABLE 4C: PRODUCTION, IMPORTS AND EXPORTS OF SAWNTIMBER IN NSW

Source	Financial Year	
	1991/92	1996/97
Domestic Production		
Native forests ('000 m^3)	556.9	382.8
Plantations ('000 m^3)	342.9	392.2
Imports ('000 m^3)	534.2	345.1
Exports ('000 m^3)	3.3	9.5

Source: ABARE 1993, 1998

The number of dwelling commencements in NSW totalled 41,570 for 1991/92 and 41,700 for 1995/96. Annual fluctuations do not explain the decline in the total production and overseas imports. It is concluded that sawntimber from other states has been able to gain a significant share of the timber market in NSW. This is consistent with the observation that NSW and Queensland are now substantial markets for Victorian hardwood (Wareing 1997). In their 1998 survey of timber markets, Tolhurst and Walton (1998) concluded that seasoned Victorian Ash was selling well into NSW and southeast Queensland, mainly because the price is competitive. They also noted that very little NSW F17 seasoned hardwood was going to Victoria, and what is being sold is often being discounted to match the price of the local ash. Compared with other States, NSW remains a major destination for imports of sawntimber. However, the proportion of imports entering NSW has remained relatively constant, at around 45% of Australia's sawntimber imports between 1991/92 and 1996/97.

Evidence of a declining share of hardwood in sawntimber production in NSW, while national shares have been maintained, suggests that maintaining competitiveness with hardwood sawntimber producers in other states will be an important to the future market development for hardwood sawmillers in both regions. This may include marketing efforts to promote NSW species to take advantage of specific qualities. It also emphasises the importance of maintaining resource supplies to producers.

New initiatives such as 'machine graded pine' are expected to increase competition in the structural timber markets. The hardwood sawmilling industry will need to continue to diversify the range of products produced, take advantage of the variation in properties of different species of eucalypts, ensure different grades of logs are used to their full potential and broaden it's customer base.

These developments confirm market observations that the future of the hardwood sawmilling industry lies with the production of value added products. With the exception of some high strength applications, it cannot compete with large scale softwood sawntimber producers for timber framing and other building applications. However, the strong demand for seasoned appearance grade timber continues, particularly demand for flooring and feature furniture components.

Potential markets for value added products include domestic and export markets. The Australwood Export Network and the Natural Feature Grade Project of Victoria have been working concurrently to further develop export market for seasoned hardwood sawntimbers, particularly in Japan and the USA (Gooding 1997, Beaumont 1998). The Australwood group of independent companies has targeted the Japanese market and built up sales to that market from zero to around 10-15% of their turnover (Gooding 1997). NSW industry development in this direction has been limited by reductions to log quotas, significant increases to log prices and uncertainty arising from structural adjustment. These factors have all had a negative impact on investment. This uncertainty has been addressed to some extent by the introduction on 1 January 1997 of 5+5 year tradeable supply Term Agreements for holders of quota quality sawlog allocations. Delivering greater resource security to the industry can be expected to facilitate industry rationalisation, increased investment in further processing and increased regional economic benefits.

4.2.1 Species

Some twenty nine species of hardwood are harvested from the native forests in upper and lower northeast RFA regions. The variation in the market potential of these species is illustrated in the table below.

TABLE 4D: MARKET POTENTIAL OF MAIN NORTHERN HARDWOOD SPECIES

Product Group	**Scantling**	**Kiln Dry Structural**	**Flooring**	**Heavy Structural**	**Furniture / Joinery**
Av. Price / m^3	**$500**	**$900**	**$950**	**$1200**	**$1400**
Blackbutt (BBT)	++	++++	++++	++	+++
Spotted Gum	++	++++	++++	++	+++
Bluegum	++	+++	++++	-	++++
New England BBT	++++	-	+++	-	++
Brush Box	-	-	++++	-	+++
Messmate	+++	-	+++	-	+++
Tallowwood	-	++++	+++	++++	+++
Silvertop Stringybark	+++	-	+++	-	++
Flooded Gum	+++	-	++++	-	+++
Ironbark	-	++	+++	++++	-
Grey Box	-	++	+++	+++	-
Whitetopped Box	-	++	+++	+++	-
BlueLeaf Stringybark	++	+++	++++	-	+++
Red Stringybark	++	+++	++++	-	+++
White Stringybark	++	+++	++++	-	+++
Yellow Stringybark	++	+++	++++	-	+++
Forest Red Gum	++	++	++++	-	+++
Turpentine	++	-	++++	+++	-
Red Mahogany	++	++	+++	-	+++
Silvertop Ash	+++	-	+++	-	+++
Grey Gum	+++	-	+++	++	++
Bloodwood	+++	-	+++	++	++
Brown Barrel	+++	-	+++	-	++
White Mahogany	++++	-	+++	++	-
White Gum	++++	-	+++	-	++
Manna Gum	++++	-	+++	-	++
Diehard Stringybark	++++	-	++	-	-
Peppermint	++++	-	-	-	-
Roundleaf Gum	++++	-	-	-	-

Source: State Forests NSW 1998

++++ High usage +++ Medium usage ++ Low usage - Not suitable

Processors receiving a high proportion of blackbutt, spotted gum or flooded gum are clearly in a better position to shift their production into value added products, such as flooring, than processors receiving a high proportion of peppermint or diehard stringybark.

4.3 ENGINEERED WOOD PRODUCTS

This sector basically comprises veneer based products, for example, veneered decorative plywood, formply, laminated veneer lumber and face veneers for overlay onto reconstituted wood products, including MDF and particleboard. Australian hardwoods have inherent strength that makes them suitable for heavy engineering applications such as formply and LVL. The drawback is weight, with hardwood veneers being considerably heavier than their softwood equivalent. It is possible to use a combination of hardwood and softwood material.

4.3.1 Laminated veneer lumber

Although consumption of LVL appears to be increasing significantly, there is currently only one LVL producer in Australia. Carter Holt Harvey owns the LVL plant at Nangwarry in South Australia. This plant produces about 30,000 m^3 per year from the surrounding softwood resource, and has the capacity to produce up to 50,000 m^3. As in the USA, most of the Australian softwood LVL is used to make I-beams which are used for joists in sub-floor framing and ceilings. Australia imports LVL from the USA, but the domestically produced grades are holding their market share and appear to be benefiting from increased promotion of the product. LVL is winning market share from large dimension sawntimber, and also has the potential to gain market share from steel in industrial building applications, although the steel industry can be expected to be a strong competitor.

Although the competitiveness of softwood LVL products is well established, the scope for producing LVL from eucalypts is less well defined. However, testing by CSIRO indicates that eucalypt based LVL would have superior properties of strength and stiffness by comparison with softwood equivalents (Ozarska, pers. coms.). The increasing hardwood plantation estate in Australia provides a growing resource base for this utilisation, and plantation grown timber should provide more consistent wood characteristics than native forest supplies.

While it appears that LVL may present a market opportunity for Australian hardwoods, log quality will be a key issue. A minimum input of around 100,000m^3 per year of veneer logs would be required for an economically viable “greenfields” mill to be developed. New facilities could be based on either hardwood or softwood resources, or optimal combinations of both. LVL for structural purposes utilises a lower grade of peeler log than is required for plywood and appearance grade veneer. An integrated operation could provide the opportunity to utilise higher grade peeler logs for producing decorative veneers while using lower grade logs for LVL production.

4.3.2 Veneer and plywood

Despite competition from other wood-based panel products and a decline in the quality of available resources, global production of plywood has remained remarkably resilient and reached a peak of over 55 million m^3 in 1996. Australia’s per capita consumption of plywood is generally low compared to that of countries such as the United States. Australia has few plywood mills and they are small on a world scale. These mills produce about 130-150,000m^3 of plywood annually. Australia imports hardwood plywood from Indonesia and softwood plywood from New Zealand to satisfy its annual consumption of about 200,000m^3. Plywood production and imports are forecast to increase slightly in 1997/98 as consumption increases due to construction activity (Love et.al. 1998).

A major threat for plywood and particleboard has been the potential for low cost plywood from Southeast Asia to flood Australian markets. The large depreciation in value of the Indonesian rupiah relative to the US dollar and Australia dollar during the latter half of 1997 is expected to result in lower prices for imported Indonesian plywood, making this product increasingly attractive for importers at least in the short term. Prices of Indonesian and Malaysian thin plywood fell by 30% between March 1997 and February 1998 (Adams and Johnson 1998) and the world plywood trade is being severely distorted by the Asian economic crisis. The current low prices are not expected to be maintained as supplies of plywood from Indonesia must fall and prices rise if sustainable harvest levels are to be achieved. However, previously proposed reductions in harvest levels may be delayed due to the depth of the current economic recession in Indonesia and its need for foreign currency.

Australia may not be able to compete with current global prices, but should be able to maintain its share of markets for high quality structural plywood. The potential to use both hardwood and softwood in Australian plywood manufacture could provide a means of optimising structural performance, appearance and price. While neither plywood nor particleboard is likely to provide the basis for large industry growth, there is a short and medium term market for high quality plywood produced at internationally competitive prices.

Currently there are two firms producing structural grade plywood from plantation softwood and native forest hardwood in the northeast RFA regions. The hardwood formply produced has competitive advantages with respect to high strength and stiffness and has been successfully exported. The outlook for the Australian plywood industry will improve if the current downward pressure on international plywood prices ceases and prices return to their former levels. There should be potential for expansion based on import replacement and the expansion of exports of products such as hardwood formply.

The two producers of veneer based products in the upper northeast NSW are operating at the lower end of world scale production, which is generally considered to begin at inputs of 50,000m^3 and 100,000m^3 for hardwood and softwood plywood respectively. Despite the intensely competitive international market, both producers are holding market share and expanding their businesses. This is at least partly due to the cooperative efforts by members of the Plywood Association of Australia (PAA) focussing on the structural quality standards of Australian plywood to differentiate locally produced plywood. Over the last 10 years, the PAA has developed a good reputation for high quality structural Australian plywood available in sufficiently large and reliable quantities. This reputation is recognised by enough domestic customers who prefer to pay more for the quality and reliability which southeast Asian producers cannot provide at discounted prices. Individual producers in Australia are left with the task of competing with each other on their respective attributes such as product appearance and their marketing skills.

Given the existing veneer and plywood producers are actually expanding their businesses, and that their products represent the global shift away from solid wood products towards alternatives made from lower volumes of small dimension timber, there appears to be a positive future for veneer and plywood production in northeast NSW. This could provide a base for further development of value added products such as 'floating floors', composite plywoods and LVL. Following their origin in Europe, floating floors are becoming increasingly popular worldwide, particularly in the USA but also in Australia. These flooring systems may comprise of panels made from thin sawntimber overlaid onto flooring grade plywood. These are installed by gluing sections of the floor together, while not actually attaching the floor to the subfloor. This gives the effect of a solid timber floor with the affordability of veneered panels and ease of installation and maintenance. The attractive features of NSW hardwoods should provide competitive advantages in domestic and export markets, although some investment in marketing may be required to build consumer familiarity.

CSIRO has tested the process of slicing veneers from various eucalypt species of East Gippsland in Victoria and then gluing or wrapping the veneer to an MDF or particleboard moulding substrate. Research teams have not encountered any major problems in the process, and the products have passed standard strength and durability tests (Ozarska 1996).

4.3.3 Particleboard

Particleboard has traditionally held a major share of the wood based panels market in Australia, and, despite losing market share due to competition with MDF, particleboard remains the highest volume panel product consumed in Australia. Demand is affected mainly by the amount of residential construction activity. Particleboard production and consumption both decreased by about 4% during 1996/97 due to a lull in the housing sector and increased consumption of MDF (ABARE 1998). However, particleboard is likely to retain dominance in many end uses because of its versatility as a building material and its price competitiveness with substitutes such as MDF. Housing activity is expected to increase again in the near term, and particleboard production and consumption should return to 1995/96 levels of about 800,000m^3 and 700,000m^3 respectively for 1997/98 (ABARE 1998). Domestic production capacity is ample to meet domestic consumption and there are producers in New Zealand who can compete effectively in the Australian market. There appears to be little scope for additional particleboard production in Australia.

4.3.4 Medium density fibreboard

The considerable growth in consumption of MDF in Australia and other countries in recent years has been substantially exceeded by expansion of processing capacity. The increase in production reflects relative stability in housing activity, an abundant supply of radiata pine roundwood thinnings, expectations of timber shortages in Asia, and a generally positive outlook for MDF over the medium term. With new capacity coming on stream, it has been suggested that Australia will reach an annual production capacity of one million m^3 before the year 2000 (Pettengill 1998). Recent studies by FORTECH suggest a total capacity of about 750,000m^3. This is still significantly above the domestic consumption of about 400,000m^3 in 1996/97.

The MDF mills established during the past few years in northeast Victoria (170,000m^3 production capacity, using only softwood fibre) and Northern Tasmania (250,000m^3 capacity, using both softwood and hardwood fibre) are dependent on export markets. Several other countries, including Malaysia, Canada, Korea and New Zealand, also have production capacity far exceeding domestic demand, creating tough competition for export markets. Currency devaluations in southeast Asia during 1997/98 are making it increasingly difficult for Australia to compete with some of these producers. Australia also faces competition for its domestic markets from neighbouring producers, particularly New Zealand and Malaysia.

While industry analysts suggest that demand will catch up with production capacity by 2001 (Pettengill 1998), MDF production in Australia will continue to be extremely competitive, and does not appear to provide attractive development opportunities in the short to medium term. Assessments of new development opportunities in southeastern Australia should note that proposals for new MDF mills in the Central Highlands and East Gippsland RFAs were eventually passed over. It is suggested that market opportunities for an MDF mill based on hardwood resources in northeast NSW currently appear minimal.

4.3.5 Oriented strandboard

OSB is primarily used as an alternative for structural plywood in house construction in North America. In Australia, dwellings are mostly constructed using timber beams and trusses for bracing, and while structural wood panels are occasionally used for flooring, roof and wall sheathing are rare. Consequently, there is currently no domestic OSB market in Australia with the implication that any new production facility would need to be export oriented.

A feasibility study by FORTECH in 1997 concluded that a proposed OSB mill for the Hunter Valley would be not be economically viable, primarily because of the lack of domestic demand and an oversupply of OSB in export markets (Nelson and Kelly 1997). Furthermore, the characteristics of native forest eucalypt fibre reduce their utility for OSB production with current technology. For the same reasons, there appears to be no scope for OSB production in northeast NSW.

4.3.6 Hardboard

Hardboard is used in a wide range of applications including weather boards, bracing for house frames, floor underlays, door skins, packaging and backing for interior automotive panels. There were three hardboard mills, producing about 75,000m^3 annually in Australia. Non-residential construction activity is the main factor affecting domestic hardboard consumption. This activity has gradually increased since 1993/94, and is forecast to continue to increase in 1997/98, which will increase hardboard consumption to about 85,000m^3. Hardboard imports from New Zealand and Brazil will continue to supply about 10,000m^3 annually, though restructuring plans for the hardboard industry in Australia will alter this balance.

The CSR hardboard plant at Bacchus Marsh in Victoria closed in early 1998 after nearly 40 years of operation. This closure is at least partly due to market pressures. Hardboard was developed in the 1930s and is now a mature product with limited potential for market growth. With marginal returns on investment, old equipment and competition from thin MDF, CSR resolved to rationalise its wood panel production in favour of its operations in Raymond Terrace (NSW) and Ipswich (QLD). This development may be related more to the competitiveness of old plant equipment and economies of scale for diversified companies than the hardboard market itself, but the inherent limitations on growth remain.

4.4 WOODCHIPS

Japan accounted for over 99% of Australia’s woodchip exports over the last decade, with volumes relatively stable at about 2.5 million bone dry tonnes. Australia’s share of Japanese hardwood woodchip imports has however fallen dramatically from 63% in 1987 (Streeting and Imber 1991) to 27% in 1995 (Kanda 1996). This decline has been attributed to a number of factors including woodchip quality, strategies to diversify supply, limits imposed by export licences and uncertainty about logging in native forests (Sar and Sledge 1994).

Although the growth of both the Japanese economy and the demand for paper have declined, the major Japanese pulp and paper companies have clearly signalled they intend to remain major importers of woodchips. They are, however, seeking to diversify their supplies and are planning to increase the area of overseas pulpwood plantations to at least around 270,000 ha (Ausnewz 1998). It is expected that these plantations will provide resources for increased Japanese demand for paper and paperboard and replace at least part of the volume of woodchips currently being obtained from native forests.

The recent economic recession in Japan has reduced its demand for imported pulpwood. Demand may remain subdued for some years. Fortunately, Australia is the only country selling pulpwood to Japan that trades in its own currency. Moreover, because of the high level of integration of the two economies, the Australian dollar has been depreciating in sympathy with the yen. This may encourage Japanese pulp and paper producers to switch to Australian suppliers to keep pulpwood costs in step with price levels in the Japanese economy. Whilst the Japanese producers will no doubt turn in the first instance to their established suppliers in Australia, the anticipated increase in demand could also create opportunities for new suppliers.

The potential to significantly expand exports of woodchips from native forests depends on the rate of recovery of the Japanese economy, the success of Japanese plans to increase the area of overseas plantations and whether Australia can convince the major Japanese paper manufacturers that the RFA process will reduce conflict over the use of native forests and improve resource security.

Northern NSW does not have the softwood resources available to provide large supplies of softwood woodchip exports. The northeast NSW hardwood forest industry has a substantial supply of sawmill residues and pulpwood resources which provides the potential to significantly expand sales. However, ability to seize on these market opportunities will be limited by resource availability and contractual security. The heterogenous nature of pulpwood from native forests, both in species and age class, generates variable quality pulp which sells at a considerable discount to woodchips from plantations. The hardwood plantation estate on the north coast, while expanding rapidly with new joint venture agreements, will not provide the critical mass of raw material required for export contracts for some years.

4.5 PULP AND PAPER

There are currently no pulp and/or paper production facilities in the study area. The opportunities for potential pulp and/or paper producers in the northeast region to enter the market are significantly limited by the initial capital cost of establishing a “greenfield” production facility and the economic viability of production. Opportunities for import replacement and export operations are investigated below.

4.5.1 Pulp production

Australia imported about 190,000 tonnes of pulp in 1997. The main grades were softwood, including bleached (129,000 tonnes) and unbleached (27,000 tonnes) coniferous sulphate. There were 16,000 tonnes of bleached non–coniferous sulphate imported in 1997. This volume is expected to expand in the future. Amcor has decided to close its Burnie pulp mill (output 70,000 tonnes per year) and use imported pulp. It will also import pulp for its new 160,000 tonnes per year machine (Maryvale 5) and its existing Maryvale machines in central Gippsland. It will need about 100,000 tonnes per year of bleached non–coniferous pulp for this purpose. Some of this could be recycled pulp from Fairfield in Melbourne.

As previously mentioned, northeast NSW does not have an integrated pulp and paper production facility with adjacent wood resources. The only viable response to the pulp supply opportunities available in the region would be the construction of a world scale facility. The benchmark for world scale in bleached kraft pulp (BKP) mills has been set by four Indonesian producers at outputs of between 500-750,000 tonnes per year. The cost would be in the vicinity of $US1.3 billion. Even if Australia did establish a world scale mill, shipping pulp on Australian vessels around the Australian coastline would be uncompetitive with imported pulp.

The purpose of an Australian BKP pulp mill would be to utilise residues from the native forest sector. Even if the volumes of such residues were to subsequently become available, it would be difficult to compete against new mills established elsewhere in the world that will ultimately run on high quality plantation resources. At the present time the Indonesian mills are running mostly on mixed tropical hardwoods until their plantation resources are sufficiently developed to support them. In the meantime, the mixed species nature of the output ensures that the (variable specification) pulp sells at a considerable discount to pulp produced from plantation forests. A mill in northeast NSW, even if the resource parcel were sufficiently large (2.2 – 3.4 million m^3 per year) would suffer from the same mixed species difficulty without the possibility of changing to a plantation base at some time in the future. With this prognosis it would be extremely difficult to find a proponent and to finance the project.

The Tasmanian Government has tried unsuccessfully to attract international interest in developing a new BKP mill. The capacity brought on or under construction in Indonesia has made the world industry and financial sector wary of supporting any further developments.

4.5.2 Hardwood chemi-thermo mechanical pulp

Hardwood pulpwood can be used in the production of bleached chemi–thermo mechanical pulp (CTMP). This type of pulp mill is of a smaller economic scale than a BKP facility, requiring an input of about 650,000 m^3 per year. The potential for a CTMP mill in south western Western Australia utilising residues from the hardwood forests was investigated by Wesfarmers Limited and re–evaluated by international consultants. It was decided not to proceed on the basis of cost competitiveness and inadequate pulpwood volumes (Beca Simons 1997).

Market considerations also limit the potential for such a mill. There is no developed market for this type of pulp and, being lower–priced than BKP, it cannot transported as far to an export destination. Such a project would almost certainly have to be developed with a partner that had a dedicated use for the output.

4.5.3 Newsprint

Australia currently imports about 230,000 tonnes per year of newsprint, mainly from Fletcher Challenge mills in New Zealand or in Canada. Fletcher Challenge has a monopoly on the production of newsprint in Australasia and feeds its New Zealand and Canadian mills with the deficit in capacity in Australia.

Although newsprint was for many years made from hardwood at the ANM Boyer mill, the preference now is overwhelmingly for softwood or de–inked pulp from post–consumer wastepaper. There is virtually no possibility of producing newsprint from mixed hardwood residues.

4.5.4 Uncoated mechanicals

Australia imports about 120,000 tonnes per year of uncoated mechanical papers, being products that fit immediately above newsprint on the grade scale. About half of this import total is supercalendared paper that is made in Scandinavia on giant machines with up to 400,000 tonnes per year capacity. Another quarter of the total is directory grade paper supplied mostly by Fletcher Challenge.

With regard to newsprint, the preferred furnish is softwood, and the scale required and established competition mean these grades are not a proposition in the study area.

4.5.5 Lightweight coated paper

On a per capita basis, Australians are the world's largest consumers of magazines. In addition, commercial letterbox catalogues are a popular means of supermarket promotion. At present there is no local producer and in 1997, Australia imported about 140,000 tonnes of these grades, although the figure has been as high as 198,000 tonnes (Ausnewz 1998).

An element of hardwood mechanical pulp is highly desirable in light weight coated (LWC) furnish because it is very fine and gives an excellent printing surface. However, about one third of the furnish needs to be softwood kraft pulp to provide sheet strength.

A greenfields mill would need to produce about 400,000 tonnes per year to compete on the world market. Therefore, the market opportunity in Australia would be too small for potential investors. Fletcher Challenge, the most likely investor to build such a machine in Australia, has recognised that a greenfields facility is not an economically viable proposition. They have considered for over 15 years the conversion of a newsprint machine at the Boyer mill to LWC production. So far they have not elected to proceed.

Amcor has converted the No 11 machine at Wesley Vale to ‘lick–coated’ paper production by installing an on machine pigmentiser, and it will market this product to the bottom end of the market. This initiative will reduce the tonnage available to any prospective LWC producer.

4.5.6 Uncoated woodfree paper

In 1997, Australia imported 165,000 tonnes of these grades. However, Amcor has appropriated the import replacement opportunity with its Maryvale 5 machine.

4.5.7 Coated woodfree paper

There would appear to be an market opportunity for increased production of coated woodfree paper in Australia. Australia imported 227,000 tonnes of coated woodfree paper in 1997. Amcor manufactures this product in Australia, producing about 50,000 tonnes at relatively high cost. The market for coated woodfree paper is growing at over 6% per year. The size of the market would probably, by the time a machine was built, justify its construction on a purely volume basis.

However, the market is divided into a variety of grades, not all of which could be produced on a single machine. With current world scale machines producing in excess of 300,000 tonnes per year, a substantial part of the output would have to be exported.

A competitive paper production machine would almost have to be integrated with its pulp supply. Given the high quality of these grades, the pulp quality would have to be consistent. As previously mentioned, the native forest resource of northeast NSW is diverse and fragemented, and could not compete with the homogenous fibre supply from plantations. Although an integrated machine might lower the overall size of the accompanying pulp mill, it is considered that attracting the massive amount of capital to a site in northern NSW would be extremely difficult. Coated paper machines are most often installed for downstream integration with existing pulp mills, although the two may not be in the same physical location, or indeed country as is the case currently in Indonesia.

Furthermore, present market considerations do not favour such a development. The world market for coated paper is currently in oversupply, and Indonesia is one of the world’s most efficient producers.

4.6 RENEWABLE ENERGY

4.6.1 Biomass combustion

Following the outcomes of the Climate Change Conference in Kyoto, and the Federal Government requirement for 2% of energy production to be generated from renewable resources, there is a commercial incentive and strong community support for the forest industry to support bioenergy facilities. Sustainable forest management, as practiced on State forests, can provide a sustainable flow of resources to bioenergy production with no net carbon dioxide emissions.

With regard to worldwide developments, it has become feasible to build small scale combined heat and power plants in the range of 4-20 MW of electricity production. Thermal co-generation power plants have been in operation for over 15 years in Scandinavian countries (Puhakka 1997). As already stated, there is an excess of residue material in northeast NSW with over one million m^3 of uncommitted residues across the two RFA regions. The State forest softwood resource at Walcha could provide all the resources required for a macro bioenergy plant. Based on the 80,000 m^3 of pulpwood that has been previously advertised for sale without success, a $20 million facility could produce about 6 MW of electrical energy and 12 MW of thermal energy (Enecon Pty Ltd 1998).

The NSW Sustainable Energy Development Authority (SEDA) is currently conducting a consultancy to examine the viability for electricity generation from wood resources in NSW. It is speculated that the cost of producing this energy would be at least 7 to 8 cents per KW hour. This cost is more expensive than the rates currently offered by more competitive coal based electricity producers, but government initiatives such as “Green Power” are designed to ensure that energy from renewable resources is affordable for customers (Crawford-Smith 1998). Green Power is now actively supported by the major electricity producers in Australia. For example, NorthPower (NSW) is offering its customers “EcoPlus” electricity, which is derived from hydro and biomass (bagasse) combustion. EcoPlus currently costs customers an extra 3.5 cents per KW hour on top of existing electricity prices, but NorthPower have identified increasing demand for Green Power. NorthPower current obtains approximately 2% of its total electricity supply from Green Power sources. They expect that demand for Green Power may encourage EcoPlus sales to comprise almost 10% of their total electricity supply by 2005 to 2010 (Phillips, pers. coms.).

4.6.2 Ethanol production

The Commonwealth Government has invested in ethanol research since 1992 to solve remaining biomass fuel problems and prove Australian and USA technology at a pilot scale. Commonwealth interest is driven by potential Landcare and forestry benefits as well as greenhouse gas and air quality issues.

Current ethanol production in Australia is based on starch and sugar wastes. Far greater potential exists with the conversion of lignocellulosic material from wood biomass to ethanol and lignin products (RIRDC 1996).

Current research work on ethanol production recognises that liquid fuels are more expensive than solid fuels due to greater energy densities, and do not currently have to compete with passive energy sources such as solar and wind. To compete on a commercial basis, ethanol production must be subsidised to match the ex-refinery (pre-excise) price of petrol. Distillation is the main reason that ethanol is expensive. The new ethanol production technologies, which promise production costs competitive with petroleum fuels, were designed into a pilot research and development plant proposed to be built and operated at the Manildra Group’s facility at Bomaderry, NSW (Cummine 1998). There appears to be potential for ethanol production from wood biomass, but it is still too early to speculate on markets and the shape of commercial scale production facilities.

4.6.3 Charcoal and activated carbon

CSIRO has been developing and testing technology for charcoal and activated carbon production over a number of years. The fluidised bed carbonisation of wood wastes was first investigated by CSIRO at the laboratory scale using sawdust and more recently in a pilot scale plant. This system is quite versatile. It can burn green wastes and wastes of various sizes (e.g. chips and sawdust), and can be controlled to allow partial combustion for charcoal production or complete combustion for maximum energy recovery. Hardwoods and softwoods have both been tested successfully. The CSIRO technology is now at the stage where process optimisation for particular wood species can be carried out on the pilot plant and this data used to confirm the design details of a full scale plant.

The charcoal produced by this process has a potentially large domestic and export market for cooking or metallurgical uses. Australia currently exports more than 60,000 tonnes per year of charcoal for these uses. The limiting factor in timber charcoal exports is the lack of reliable supplies of consistent quality from the traditional low technology charcoal burners (Enecon Pty Ltd 1998). The new CSIRO technology could potentially solve the quality and reliability problems.

Charcoal can also be used as a feedstock for production of activated carbon. All activated carbon used in Australia for gold recovery is imported. The principal attribute for carbon used for gold recovery is hardness and resistance to abrasion, which enables the carbon to withstand degradation in the recovery process and thereby minimise gold losses. Carbon for the gold industry sells for a higher price than other carbons that have less stringent physical requirements. Activated carbon produced from timber does not normally have the required hardness levels required by the gold industry, so CSIRO developed technology to process the charcoal prior to activation and increase the hardness achieved. Initial samples of carbon made from jarrah have been tested in Western Australia and found to perform as well as the commercial carbon used in the industry (Enecon Pty Ltd 1998). The carbons produced by the CSIRO process also have potential applications in the water treatment, food and chemical industries, where timber based carbons from other countries are already used.

5. INDUSTRY DEVELOPMENT OPTIONS

The aim of this chapter is to identify industry development options that could provide viable investment opportunities over the life of the RFA. Details of these options will be further developed in separate reports for each of the upper and lower northeast regions. Resulting from the foregoing analysis of resources, the existing forest industries and markets, key opportunities for industry development across the RFA regions include:

- ongoing development of the hardwood sawmilling sector;
- ongoing development of the veneer and plywood industry;
- potential development of a laminated veneer lumber facility;
- an expansion of woodchip exports; and
- bioenergy production including heat and power and possible charcoal production.

The north coast is an important focal point for hardwood plantation establishment in NSW. Section 2.2.1 described the current hardwood plantation estate in the two northeast RFA regions, which currently total about 45,000 ha, and State Forests of NSW's intent to establish 10,000 ha per year in this area. This establishment plan would create a north coast estate in excess of 100,000 ha by the mid point of the forthcoming RFAs. However, less than 30,000 ha would be available to provide wood fibre for sawlog or pulpwood before the year 2010, that is, the latter part of the current RFA planning horizon. In this sense, the hardwood plantations estate on the north coast of NSW is not currently a large component of the existing timber industry, but will become a much larger component of subsequent RFAs. During the lifetime of the initial RFAs, there are considerable industry development opportunities in establishing nurseries, investment opportunities in carbon sinks, and sawmilling equipment and expertise to process small diameter plantation hardwood timber. This important work has already begun in various parts of the two RFA regions, and will continue to gather momentum as the interest in hardwood plantations increases.

The relative success of the nominated opportunities will be determined in the market place and by the competitiveness of the forest industries. It is not the intention in this study to identify specific industry strategies for promoting industry development. Rather the approach has been to identify the most viable development options recognising that market forces will determine success of specific investments. Modelling this industry structure is the function of the FORUM economic model with the options identified in this study providing input on specific development options. However, throughout the course of the analysis a number of issues and observations have arisen which could be considered to be important to maintaining competitiveness of the forest industries in the regions. These issues are identified below to provide an overview of the characteristics of the industry that might be expected:

- it is likely that forest industry restructuring will continue for some time. The Forest Industry Structural Adjustment Package (FISAP) has played an important role in facilitating restructuring that will help provide a sound basis for future development. There is substantial development potential for the forest industries in both regions if supplies can be maintained, and this potential could be significantly increased if access to resources is expanded;
- the provision of contractual resource security is vital to industry development. While this security has been provided to some extent for quota log users, it needs to be extended for all sawlog users if value adding is to occur across the full range of logs;
- it is likely that Boral Timber will remain the dominant wood processor in northern NSW; and
- it is the view of some people in the industry that significant effort is required for marketing the region's forest products to maximise returns from value adding. Potential issues in this regard include standardising product grades and species group names, coordination of value adding through centralised processing centres, and cooperative efforts to address common issues such as marketing and promotion, after sales service and research and development. The success of the Australwood joint marketing initiative in Victoria is often cited as an example of the benefits of cooperation (Gooding 1997).

5.1 HARDWOOD SAWMILLING

The key components to future development of hardwood sawmilling in both regions are likely to be:

- increasing the proportion of output that is directed to value adding - this can occur across the full range of products currently produced in the region with a major challenge to increase value adding in non quota sawlogs. This will include increasing the proportion of appearance grade products that are recovered from seasoned timber;
- increased utilisation of log inputs through higher recovery rates for primary products especially from smaller logs as well as through the production of value added products from secondary products eg, by finger jointing short pieces of timber; and
- continuing to identify and expand markets where the inherent properties of various hardwoods (durability, appearance, strength and hardness) provide a competitive advantage in niche markets.

These options are consistent with trends over the last five to 10 years. As the market for unseasoned hardwood house framing timber declined in the face of competition from plantation softwood, hardwood sawmillers have been progressively making the transition from unseasoned to higher value seasoned products.

The hardwood timber industry already produces a diverse range of products and is expected to diversify further as an increasing proportion of total production is seasoned. At the industry level, market demand and improved profit margins are driving the shift towards increased production of seasoned timber. At the company level however, variables such as the scale of operations, species being processed, and the size and quality of available sawlog resources will shape whether further investment in value added processing will lead to improved profit margins.

While it is expected that the number of sawmills will reduce it is likely that mills of various sizes reflecting current structures will continue to exist. This will be facilitated by continuing markets for some green sawn material, the availability of small scale kilns which allow even relatively small mills to dry timber and from value adding mills sourcing green sawn input from smaller mills. Table 5a illustrates the type of structure that might characterise the hardwood sawmilling industry in the future.

TABLE 5A: BROAD CLASSIFICATION OF SAWNTIMBER PRODUCERS

Annual Log Input	Processing Facilities	Principal Products Produced
Up to 6,000 m^3	Conventional sawmill	Green structural timber (F8)
6,000-20,000 m^3	Conventional sawmill Drying kilns & planers	Seasoned structural timber (F17) Some green structural (F8)
20,000-50,000 m^3	Bandsaw mill Drying kilns & moulders Laminating & finger jointing equipment	Maximum recovery of appearance grades. Seasoned structural (F17) No unseasoned timber
Over 50,000 m^3	Bandsaw mill Drying kilns & moulders Laminating, finger jointing &other re-processing facilities.	Appearance grade products. Capacity to supply export markets with joinery/furniture components

The lack of scale to seriously address export operations for example can be addressed by the development of networks and alliances. Initiatives such as the Australwood Export Network and the Victorian Timber Promotion Council's Hardwood Product Certification Scheme (Gooding 1997) are examples of joint action by individual firms to develop and expand markets for value added products.

Pressure to maximise the recovery and use of products from high quality logs has led to consideration of the production of veneer rather than sawntimber from these logs. The integration of veneer slicing and sawing by larger firms with log intakes that can support a vertical slicer and a capacity to process the equivalent of 5,000 m^3 of logs per year is a potential development option for the regions. However, trials to date have indicated that a higher recovery of face grade veneer is required to justify the investment of about $5 million in veneer slicing equipment, drying and grading facilities (M^c^Combe et. al. 1996).

5.1.1 Lower grade logs

The recovery of sawntimber from lower quality logs provides an opportunity to increase the supply of sawntimber from a finite resource base. As lower quality logs generally produce a high proportion of small dimension, short length material, interest has been shown in the processing of these logs to produce pallet timber. Although the demand for pallet timber is growing at a similar rate to that of the Australian economy, the need to improve the quality of pallets has led Australia's leading provider of pallets to progressively reduce it's number of suppliers of pallet timber. There would appear to be an opportunity for larger scale mills focussed on quality pallet production.

Dormit Pty Ltd in Victoria has pioneered the large scale sawing of low quality regrowth logs and since 1990 has become a major producer of pallet timber. The success of Dormit's operation appears to be related to the following:

- a guaranteed substantial log intake (80,000 to 100,000 tonnes per year) with relatively short haulage distances;
- a regrowth resource providing greater uniformity with respect to log size and limited pipe defect;
- installation of specialised sawing equipment to achieve high rates of production;
- a reliable contract to supply pallet timber; and

- well established markets for all residues that include woodchips, playground surfacing and mulch for market gardens.

Over the last eight years Dormit has demonstrated that logs that are inferior to sawlogs can be successfully sawn to produce sawntimber for pallets and possibly other applications. A plant of a similar scale to that of Dormit would represent an investment of about $6 million. There may be potential for similar operations in northeast NSW processing regrowth resources. However, some of the above mentioned critical success factors, particularly those relating to short haulage distances and resource uniformity, may be difficult to satisfy with the relatively fragmented and diverse resource. Indeed, pallet producers in northeast NSW have identified significant differences between the wood supply in Victoria and NSW, particularly the lack of contractual resource security and the poorer quality of non-quota logs available in their region.

If a large scale industry utilising pulpwood becomes a reality, there is an opportunity to incorporate a dedicated recovery mill. This has advantages in that it will allow recovery of material that is currently uneconomic to haul from the forest. All suitable material would pass through the recovery mill with utilisable timber recovered prior to the remainder going to chip. North Forest Products at Longreach had a recovery mill in the 1970s that was not economically viable, but as resource availability tightened, a redesigned mill at that site became viable in the 1990s. It is understood that the feasibility of a new recovery mill is currently being assessed in the southeast region of NSW.

5.1.2 Small dimension timber

Small end section material has traditionally presented utilisation problems within the hardwood sawmilling industry. It is generally the lowest priced product and is usually relatively expensive to handle. Overseas experience, particularly in Malaysia, has shown that it is economically viable to remanufacture this material into large sections through finger jointing and edge glue laminating. The resultant board (usually 2m x 1m) is then re-cut and used in the furniture industry for products including table tops and chair frames, thereby taking a low value product and turning it into a very high value product. Other forms of re-manufacturing are also employed where the material is made into long narrow lengths and moulded for skirting boards.

Establishment of a single facility to process this material would bring the benefits of high throughput and lower cost. In addition customers (principally furniture manufactures) would be dealing with the one entity and therefore could guarantee quality and supply. A centralised facility would need to be located so as to minimise raw material transport costs. The plant could be further expanded to produce engineered timber products such as glue laminated beams for products including lintels and verandah posts. The production of sawntimber from small logs, either small graded logs or plantation and regrowth thinnings will also produce material suitable for this facility. The viability of a plant like this will depend on resource volume to be competitive. A smaller facility, of say 10,000 m^3 log input should be viable and would meet most of the existing demand in the domestic market. However, world scale for this type of mill is more likely to be around 20,000 – 25,000 m^3 log input per year.

There may be an opportunity to capitalise on waste and low value material by individual operators through combining outputs, streamed toward a single product or range of products. For example, a veneer manufacturer may cut chair backs and seats from waste veneer, a sawmiller may manufacture legs by finger jointing and glue laminating short and small end section material together and a third entity may manufacture the chair.

5.2 VENEER, PLYWOOD AND LVL

There appears to be a positive future for veneer and plywood production in northeast NSW. The existing producers are actually expanding their businesses, and their products represent the global shift away from solid wood products towards alternatives made from lower volumes of small dimension timber. Furthermore, existing technology provides for a large range of veneer based products, providing for structural and/or appearance grade applications.

This technology could provide a base for further development of value added products such as veneered panels, 'floating floors', composite plywoods and LVL. As previously mentioned, CSIRO have tested the process of slicing veneers from various eucalypt species of East Gippsland in Victoria and then gluing or wrapping the veneer to an MDF or particleboard moulding substrate. Slicing provides a higher appearance grade than peeling veneers from the logs and should command a higher return in decorative applications. The CSIRO research teams have not encountered any major problems in the process, and the products have passed standard strength and durability tests (Ozarska 1996). Veneered panels and pieces are widely used for furniture, joinery and panelling.

The NSW Department of State and Regional Development has undertaken product testing with sliced veneers from northern NSW species. In 1994/95, various species and samples were trialed to establish a production methodology and subsequent performance of sliced veneer laminated on plywood substances. The results of these trials support the further development of veneer based products from structural and appearance applications (NSWSRD pers. coms.). With existing technology, these products can be made from wood sections that have at least a one metre clear run without major flaws.

Small volumes of short length laminated veneer lumber (LVL) are produced in the upper northeast RFA region of NSW. There would appear to be an attractive opportunity to produce longer length LVL for sales into an increasing domestic market, currently supplied by only one domestic producer, located in South Australia, and imports from North America. Softwood LVL is cheaper to produce than hardwood products, and can satisfy most of the strength and durability characteristics required by current markets. The most competitive LVL production opportunity would be one based on a large, consolidated softwood resource. The State forests' *Pinus radiata* plantation in the Walcha-Nundle area qualifies for consideration of this option.

There may also be an opportunity to produce hardwood LVL in northeast NSW. Despite the increased costs of the product, producers may profit from a competitive advantage in high strength applications and appearance features. Given its superior strength properties, hardwood LVL could be made in shorter width and depth dimensions, generating advantages in resource utilisation and product features (Ozarska, pers. coms.). Hardwood LVL producers may utilise softwood veneers for non-face layers to reduce costs, and vice versa. Hardwood veneers on the faces provide the extra stiffness that exceeds the structural performance of 100% softwood products. Although LVL is used in Australia primarily for structural applications, the Japanese construction industry has shown strong demand for hardwood LVL in non-structural applications.

5.3 WOODCHIPS

As previously outlined there is a large volume of residues which remain unutilised at present. Economic use of these residues would increase flexibility in forest management and provide scope for increasing volumes of higher value logs. The major constraint on utilisation of these residues is the lack of a port within economic haulage distance, as the only large scale chip mill is located at the southern end of the lower northeast region. While Brisbane provides a potential outlet for woodchips from the upper northeast region, a large proportion of the forest resources in this region are at marginal haulage distances. Exporting woodchips from Brisbane may be commercially viable if:

- moisture content of logs is managed to minimise transported weights;
- double handling is limited; and,
- longer haulage distances are balanced with shorter hauls.

The construction of woodchip loading facility and port elsewhere on the upper north coast would assist in guaranteeing the viability of such a venture.

In the longer term, markets for mixed species chips derived from native forests could expect to face increasing competition from plantation grown material. However, if markets could be established now, there is opportunity to derive increasing volumes from plantation resources being established along the north coast.

5.4 BIOENERGY PRODUCTION

Alternate uses for sawmill residues include boiler fuel to provide heat and steam for processing and kiln drying plants, chipping for landscaping and garden mulch, and sawdust for various manufacturing processes. While some of these uses derive benefit from recycling by-products, other activities are undertaken on the basis of trying to remove a waste problem from the mill site rather than financial gain.

An alternative residue utilisation strategy may be centralised power generation. Section 4.6.1 described the market for bioenergy produced from biomass combustion. The location of a centralised biomass facility would need to be carefully considered, with haulage distance of fuel, water supplies, workforce and distance from major transmission infrastructure being of critical importance to economic viability. Establishment of smaller co-generation stations as cooperatives between processors should also be investigated. In the northern timber catchments of northeast NSW, where the opportunity to sell pulpwood is limited, significant timber residues are available and suitable for bioenergy production.

5.5 CHARCOAL AND ACTIVATED CARBON PRODUCTION

Section 4.6.3 described the current status of charcoal and activated carbon production from wood resources in Australia. This opportunity is particularly attractive in northeast NSW, as it would capitalise on the dense timber species growing in the region, and use sawmill residues and low grade logs to provide higher value products in demand by domestic and international markets. Charcoal and activated carbon production can be built up flexibly and progressively in modular units to suit the availability of feedstocks, capital and product requirements. This modular development would reduce the risks associated with a new venture. Furthermore, this option is less dependent on large volumes of resources, being based primarily on the use sophisticated technology to extract maximum value from the resource. The feasibility of charcoal and activated carbon production should be investigated in both RFA regions.

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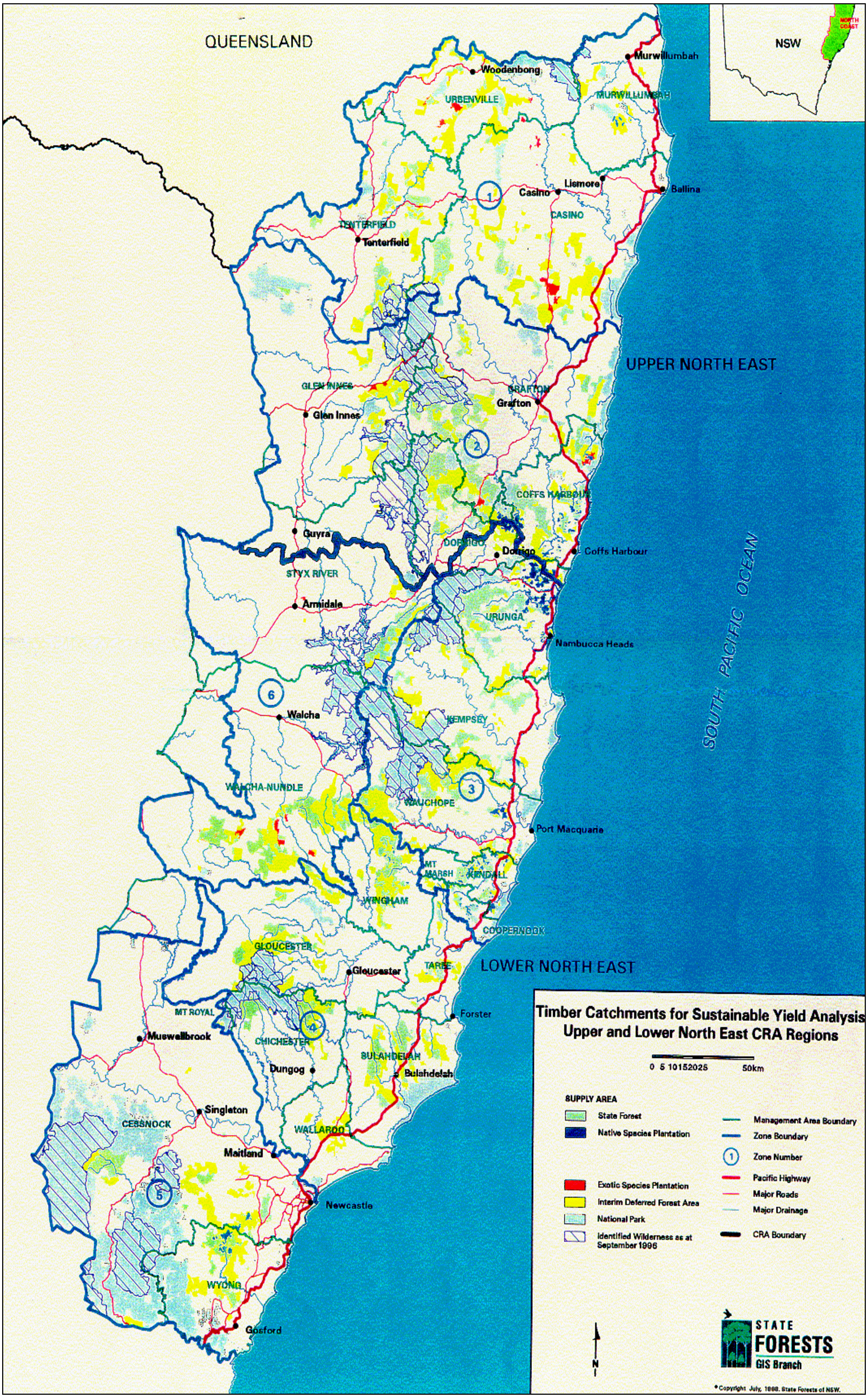
ANNEX 1

TIMBER CATCHMENTS FOR SUSTAINABLE YIELD ANALYSIS – UPPER AND LOWER NORTHEAST CRA REGIONS MAP



QUEENSLAND
NSW
NORTH COAST
Woodenbong
Murwillumbah
URBENVILLE
MURWILLUMBAH
Lismore
Casino
Ballina
CASINO
TENTERFIELD
Tenterfield
UPPER NORTH EAST
GLEN INNES
Glen Innes
GRAFTON
Grafton
COFFS HARBOUR
Guyra
DORRIGO
Dorrigo
Coffs Harbour
STYX RIVER
Armidale
URUNGA
Nambucca Heads
SOUTH PACIFIC OCEAN
Walcha
KEMPSEY
WALCHA-NUNDLE
WAUCHOPE
Port Macquarie
MT MARSH
KENDALL
WINGHAM
COOPERNOOK
GLOUCESTER
Gloucester
TAREE
LOWER NORTH EAST
MT ROYAL
Forster
Muswellbrook
CHICHESTER
BULAHDELAH
Dungog
Bulahdelah
Singleton
CESSNOCK
WALLAROO
Maitland
Newcastle
WYONG
Gosford
1
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4
5
6
Timber Catchments for Sustainable Yield Analysis
Upper and Lower North East CRA Regions
0 5 10152025 50km
SUPPLY AREA
State Forest
Native Species Plantation
Exotic Species Plantation
Interim Deferred Forest Area
National Park
Identified Wilderness as at September 1996
Management Area Boundary
Zone Boundary
Zone Number
Pacific Highway
Major Roads
Major Drainage
CRA Boundary
N
STATE FORESTS
GIS Branch
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PART 2:

UPPER NORTHEAST RFA REGION

7. INTRODUCTION

The purpose of this report is to detail selected industry development opportunities for the upper northeast RFA region of NSW. The options relate to value adding, transformation, and expansion opportunities, and stem from a review (Part 1) of the wood and wood products industry in both the upper and lower northeast RFA regions. This review included analysis of forest resources, existing industry structures, industry competitiveness and market opportunities.

This report provides an assessment of these options and the basis for inputs to FORUM, an economic model run by ABARE for the economic assessment component of the RFA development process. Results of the FORUM analysis will be used in conjunction with non-economic factors to determine the full impact of various resource availability scenarios being considered during the development of an RFA for the upper northeast region.

8. INDUSTRY DEVELOPMENT OPTIONS

8.1 OVERVIEW

The upper northeast RFA region is defined in Annex 1 of the Part 1 report. The current structure of the wood and wood products industry in this region is outlined in Table 8a.

TABLE 8A: OVERVIEW OF WOOD PROCESSING INDUSTRY IN UPPER NORTHEAST REGION

Processing facility	***No.****	***Comments***
Sawmill (<1000 m3)	28	Conventional sawmills Scattered across region
Sawmill (<10,000 m3)	19	Conventional sawmills, with some value-adding equipment, e.g. drying kilns and planer Scattered across region
Sawmill (10-30,000 m3)	8	Some conventional sawmills Also bandsaw mills with drying kilns and moulders, laminating and finger-jointing equipment.
Sawmill (30,000+ m3)	3	Larger processing facilities, with all value adding equipment listed above. These facilities located in State Forests' districts of Grafton and Urbenville.
Plywood / Veneer	2	Large, well established facilities at Grafton (hardwood, with increasing proportion of softwood) and Kyogle (primarily softwood) producing various veneer based products
Total	60	

* Number of mills of specified intake capacity based on volumes supplied by State Forests of NSW in 1996/97. Some mills take significant proportions of wood from private property (in some cases, their own).

In many regards, the upper northeast and the lower northeast RFA regions of NSW have similar characteristics. As discussed in the combined review (Part 1), these include a relatively fragmented and diverse forest resource and a similarly fragmented and diverse wood products industry built on relatively small sawmills. However, there are also some key differences between the wood products industries of the two regions. The upper northeast region is unique for reasons that include:

- there is no export port within close proximity to the largest timber catchments (Grafton is approximately 400km from Newcastle and 300km from Brisbane), a fact that limits opportunities to utilise large surplus volumes of wood residues;

- it is a focal point for hardwood plantation development in NSW, with State Forests of NSW aiming to expand the existing resource by approximately 10,000ha each year from 1997/98 into the medium term; and
- the only two plywood and veneer producers in northeast NSW are located in this region, and despite being at the lower end of world scale production, both are expanding their businesses and providing leadership in the maximum use of resources.

These key differences are significant factors in determining what industry development options are likely for either or both of the two northeast RFA regions. For the upper northeast region, there are three clear directions. First, there is a large surplus volume of wood residues from sawmill residues, sawlog based operations in native forests and silvicultural operations in the developing plantation estate. As outlined in Part 1, economically viable options for these residues include woodchip exports through a northern port, or the production of bioenergy, charcoal and/or activated carbon.

Second, the production of veneer based products is a focal point in the region, with the existing industry deriving maximum value from the available resources and making a significant contribution to regional employment. The success of this industry provides a solid basis for future growth through expansion of veneer based manufacture. Another option for expansion is the production of long length laminated veneer lumber (LVL). Demand for this product is gradually increasing in Australia, and there is currently only one producer in Australia.

Third, common to both northeast regions is a need to address the structural adjustment required of the hardwood sawmilling industry in light of recent reductions in resource allocations and the changing nature of the resource. This process of change has begun and is being facilitated by government initiatives supporting increased efficiency and value adding operations. Market forces will determine the final structure of this industry. However, as outlined in Part 1, it is expected that development will be based on increased value adding, and increased recovery rates combined with the introduction of new technologies.

In summary, the most likely industry development options for the upper northeast region appear to be:

- continued development of hardwood sawmilling sector based around processing ‘nodes’ including ongoing development of plywood and veneer;
- woodchip exports through a northern port;
- world scale hardwood LVL production;
- bioenergy production; and
- charcoal and activated carbon production.

8.2 OPTION 1: HARDWOOD SAWNTIMBER VALUE ADDING DEVELOPMENTS

8.2.1 Opportunity

As outlined in Part 1, the hardwood sawntimber industry, both nationally and in northeast NSW, is already undergoing significant change emphasizing the production of higher value products. The development of new technologies and products is extending this value adding to smaller logs and leading to greater utilization (higher recovery rates) of hardwood logs. These changes reflect market and other pressures focused on extracting maximum value from forest resources that have reduced in quantity and quality. The impact of these changes in northeast NSW is compounded by the diverse and fragmented nature of the forest resources, with an equally diverse and fragmented industry infrastructure based on these resources. The forest industry in the region needs to expedite this development to capitalise on medium term opportunities from integrated, value adding operations.

It is expected that the moves already underway to increase the proportion of value adding processing across the industry will continue to develop and that as the number of individual mills decline, centralised processing ‘nodes’ will develop across the region. These nodes would draw on wood resources from forest owner allocations and processed wood products provided by other suppliers. The extra allocations from other processors would boost throughput required to afford investment in technology and training for further value added processing. Downstream processing of boards may include kiln drying, glue-lamination of small end section material, veneer slicers for appearance grade products, and the manufacture of parquetry and furniture components.

This development would provide economic benefits for the downstream processor. It should also provide significant benefit for processors upstream, who are currently achieving only marginal returns or losses on preliminary wood processing operations, and do not have the throughput to justify additional investment. These processors could expect higher prices for their products from the downstream processor, who would afford to pay more than consumers of green sawntimber as they will generate products of much higher value.

Given the fragmented nature of the resource, and relatively high costs of wood transport, the location of value adding processing nodes is consistent with the success of this industry structure. In the upper northeast RFA region, the most likely sites for these nodes are areas in close proximity to Casino/Lismore, Tenterfield and Grafton. These three areas are central to relatively large concentrations of forest resources, and the industrial facilities associated with towns of this size, including good road and rail networks.

The nature of development of the hardwood sawntimber industry is different from most other options, which relate to specific or relatively discrete operations that can be clearly defined and costed. The future development of the hardwood sawntimber industry relates to a process of incremental industry transformation, which will, and should, happen gradually over the next five to ten years, with the actual speed determined largely by resource allocations and market opportunities during that time.

The nature of the foreseen growth and development in the sawntimber industry means that it is not possible to accurately estimate specific costs (and returns) for specific investments by particular mills. However, given the identified market opportunities, growth and development in the hardwood sawmilling sector can be represented by three factors:

- an increase in the proportion of wood that is directed to value adding processes;
- an increase in the rates of recovery of various products across the range of wood processed in hardwood sawmills in the region; and
- an increase in the average price for value added hardwood sawntimber products.

The further development of value adding processing nodes could include the installation of the following processes:

- sawing capacity for ‘smalls’ and ‘super smalls’ (<15cm sed)
- kilns – solar, electric, or heat from cogeneration of energy from biomass combustion;
- hardwood veneer slicer for appearance grade veneers;
- finger jointing and glue lamination lines for small end dimension material; and

- moulding and millwork lines for manufacture of furniture and decorative feature pieces.

8.2.2 Costs

For the reasons discussed above, value adding investment costs will be spread across a range of investments and across a number of mills as well as over time. Many of the potential technologies can vary in scale depending on the volumes being processed by a mill. These investments will incur a wide range of capital and operating costs. For instance, the establishment of a new hardwood veneer slicer and drying facility would cost in the order of $5 million, with variations dependent on existing equipment. Conventional kilns with a drying capacity of $50m^3$ currently cost in the order of $150,000 each for a ready-to-dry assembly, with significant increases in energy requirements. Solar kilns vary in capacity and price, but an example from the region has a capacity of 8-10 m^3 capacity and costs approximately $25,000, and requires relatively little extra energy (FORTECH 1994).

For these reasons, costs are not identified for specific investments. Rather, it is proposed that indicative industry developments be represented by changing industry returns likely to stem from industry wide movements in value adding and associated recovery rates.

8.2.3 Returns

Estimating returns from future development of the hardwood sawntimber industry is complex. Given the future development opportunities that have been identified, economic returns are likely to increase as a result of a combination of factors. These include increasing the proportion of wood directed to value added products (both in mills where primary processing occurs as well as by sales from smaller mills to mills in value adding nodes), increasing sawntimber recovery, and increasing the average price for value-added products higher, that is, producing products with a higher ratio of product price to costs.

It would be a highly complex task to represent these changes across the region, one that would require detailed estimates of individual mills and their future investment plans. As this level of information is not available the potential future impacts are indicated through the application of an across-the-board representation of increased value adding. This is represented in Table 8b by increasing the proportion of various log categories that are directed to value adding outputs.

The estimates provided in Table 8b assume that value adding is represented by any processing beyond green sawn with an appropriate increase in product value (assuming this exceeds costs). Further, increased proportions of products going to value adding are assumed to provide returns commensurate with average prices. Based on these assumptions, Table 8b shows the increase in returns likely to stem from continued development as described. This table attempts to provide estimates of these returns from realistic value adding ‘targets’ based on the existing infrastructure and consultation undertaken during the course of this study. This simple illustration does not incorporate the cost reduction benefits derived from increasing efficiency in wood flows and economies of scale. Neither does the illustration account for the economic benefits gained from enhanced integration of the wood processing industry, with increased opportunities to market larger volumes of products of consistent dimension and quality. The scale of these potential benefits is directly linked to the scale of industry integration and the development of the nodes, and as such, will be realised incrementally over time.

Table 8b illustrates indicative returns that could be generated by future development of the hardwood sawmilling industry in the upper northeast region at current resource levels. These types of gains could also be increased by expansion of the resources made available to the industry.

TABLE 8B. POTENTIAL RETURNS FROM INCREASED VALUE ADDING PROCESSING OF HARDWOOD RESOURCES

Estimated returns from current value adding practices

Resource	SFNSW	Recover 40%	Current VA%	$ Primary	$ Value adding	$ Totals		$/m^3
Quota	159,000	63,600	55%	15,741,000	31,482,000	47,223,000	Primary Quota	550
Small	24,000	9,600	60%	1,728,000	5,184,000	6,912,000	Small	450
Ungraded	88,000	35,200	8%	11,334,400	2,534,400	13,868,800	Ungraded	350
Total $ returns						68,003,800	VA	900

Increased proportion of wood to value adding practices

		Recover 40%	Target VA%	$ Primary	$ Value adding	$ Totals		$/m^3
Quota	159,000	63,600	70%	10,494,000	40,068,000	50,562,000	Primary Quota	550
Small	24,000	9,600	70%	1,296,000	6,048,000	7,344,000	Small	450
Ungraded	88,000	35,200	30%	8,624,000	9,504,000	18,128,000	Ungraded	350
Total $ returns						76,034,000	VA	900

Increased value adding and sawntimber recovery

		Recover 55%	Target VA%	$ Primary	$ Value adding	$ Totals		$/m^3
Quota	159,000	87,450	70%	14,429,250	55,093,500	69,522,750	Primary Quota	550
Small	24,000	13,200	70%	1,782,000	8,316,000	10,098,000	Small	450
Ungraded	88,000	48,400	30%	11,858,000	13,068,000	24,926,000	Ungraded	350
Total $ returns						104,546,750	VA	900

Increased value adding, sawntimber recovery, and average price for value-added products

		Recover 55%	Target VA%	$ Primary	$ Value adding	$ Totals		$/m^3
Quota	159,000	87,450	70%	14,429,250	73,458,000	87,887,250	Primary Quota	550
Small	24,000	13,200	70%	1,782,000	11,088,000	12,870,000	Small	450
Ungraded	88,000	48,400	30%	11,858,000	17,424,000	29,282,000	Ungraded	350
Total $ returns						130,039,250	VA	1200

8.2.4 Resource allocation scenarios

In the course of structural adjustments following the Forest Reform package of 1996, sawmilling companies of various sizes have closed their mill facilities and/or downsized to cope with the substantial reductions in resource allocations. Participants at the forest industry workshop in Grafton (see Part 1) gave the clear message that any further reductions in resource allocations would result in the accelerated decline of sawmill numbers across the upper northeast and lower northeast regions. Many sawmills still operating appear to be on the brink of economic viability, and are dependent on sustained or increased throughputs for survival.

The 50% scenario would therefore dramatically change the location and shape of the sawmilling industry in northeast NSW. However, those sawmills that survive the transition would almost certainly pursue the further development of value adding processor nodes. With reduced throughputs, all sawmills would have even fewer returns to cover capital investment in value adding equipment and marketing programs. Sawmilling companies would be forced to focus their efforts primarily on cost reductions through increased efficiencies, and pool their low cost products with other suppliers to create the critical mass required for the development of value added products. Developments in this direction would be hampered by the cost of transportation and other overheads, which increase in impact as the product volumes fall and the distance between viable industrial centres grow.

Increases in resource supply are likely to provide greater insurance for capital investment in value adding equipment and marketing programs. Where tight operations may be limited to the development of a select range of products, extra supply volumes provide an opportunity to expand into new product lines, increasing the flexibility and stability of the industry. However, the nature of the volume increases will be an important factor determining the proportion of wood directed into value adding products.

8.2.5 Research and development

There are no substantial technical obstacles presented by the proposed development of the hardwood sawntimber industry at this stage. Northern NSW already has the expertise, and in some cases, installed capacity, to further develop increased value adding and recovery rates identified. Some of the options may require some additional research and development into sawing technologies. CSIRO and industry stakeholders have already begun this work, notably the sawing and drying of small and super small logs, cogeneration of energy from biomass combustion, and the slicing of veneers from selected eucalypt species. Progress on this work can and will increase as investor interest increases in the region.

8.2.6 Constraints

As discussed in Part 1, the major constraint on future development of the hardwood sawntimber industry is likely to be the availability of suitable resources. This will affect the number of processors as well as the number of value adding 'nodes' that are likely to be sustained. However, a framework of four to six value adding processor nodes receiving 50-60% of sawntimber appears to be appropriate for all of the supply scenarios considered in this study. It is important to note that green sawntimber still has a niche market that should not be overlooked, and there will be opportunities for millers of green sawntimber in the evolving industry structure.

8.3 OPTION 2: WOODCHIP EXPORTS THROUGH NORTHERN PORT

8.3.1 Opportunity

The export woodchip trade from Australia provides attractive returns from the utilisation of sawmill residues as well as from pulpwood derived from thinning operations and sawlog harvesting. While the recent downturn in the Japanese economy has led to subdued demand, Australian producers have been less affected by others because of the practice of selling in Australian dollars. As the Australian dollar has depreciated with the yen there has been no increase in prices for the Japanese associated with the yen devaluation.

In the short term, Australia is well placed to expand woodchip exports to Japan. However, the scope to do this will largely depend on the rate of recovery in the Japanese economy. In addition, in the longer term woodchips derived from mixed species native forests will face increasing competition from plantation grown resources (see Part 1). Nevertheless, the opportunity remains to expand woodchip exports from the upper northeast region. This would allow utilisation of sawmill residues that are currently burnt as well as facilitate enhanced native and plantation forest management.

In general, the long haulage distances required limit increasing the volume of exports through the port of Newcastle. Newcastle is approximately 400 km from Grafton. Thus, to be economically viable it is likely that woodchip exports from the upper northeast would require export through a northern port. At present, Brisbane is the only option, but there is also the opportunity to create a new port and chip mill facility in the region.

Either of these options would require a significant critical mass (which is available) to initiate a new contract. Exports through Brisbane would necessitate relatively long haulage distances even for wood resources in the far northeast of the region. The construction of a new woodchip loading facility and port elsewhere on the upper northeast coast would reduce the haulage distance required, and improve the economic viability of this option.

The commencement of woodchip exports through a northern port provides an associated industry development option, being the establishment of a centralised chip facility with an integrated recovery mill. A chip facility within a large timber catchment would provide the infrastructure required to pool, sort and process woodchip resources according to grade and, through economies of scale, reduce the economic and environmental costs of operating mobile chippers at the harvesting site.

The advantage of an integrated recovery mill is that it provides for recovery of material that would otherwise be sold as lower value pulpwood or would be left on site. It is not economically viable to haul this resource from the forest for sawn wood alone due to the low recovery of sawn product. For example, a recovery mill in Grafton would receive pulpwood supplies from the surrounding timber catchment for about $42/m^3, including approximately $20/m^3 for harvesting, $7/m^3 State forests royalty, and an average of $15/m^3 for transportation. Assuming recovery of sawntimber is 25%, the sawntimber itself is worth $168. The cost of production is worth at least $120/m^3, so the minimum price for say pallet material at the mill door is $288/m^3. This material is currently selling for less than $230/m^3 (Tolhurst and Walton 1998).

The intention of this option is that the recovery mill would produce flitches for reprocessing by other existing wood processors. The reprocessors could be expected to pay more for the flitches than logs as they will obtain higher recovery, and it is reasonable to assume the cartage distance would be shorter, given the new facility would be sited in a central, industrial area.

A more simple variation of this option is to focus solely on minimising the cost of exporting woodchips through Brisbane. Pulpwood could be transported directly from the harvest area to the port at Brisbane. The logs would be chipped in Brisbane at a small chipping facility before being loaded onto the ships. This option could incorporate a small recovery mill facility, though this would be limited by the infrastructure at or near the port, and would be a lower priority than woodchip exports.

The advantage of this option is that it would avoid the costs associated with double handling, and pulpwood could be transported directly to the port rather than via Casino. However, the disadvantages are that it does not encourage the value-adding associated with extracting sawntimber from pulpwood, and northeast NSW would lose economic benefits to Brisbane. For these reasons, this alternative option is not pursued in this study.

8.3.2 Resource availability, facility locations and costs

The Part 1 report provides an estimate of hardwood residues available in the upper northeast region of NSW (Section 2.1.5). Woodchips for export could be sourced from pulpwood in native forests, hardwood plantations and private property, and sawmill residues. The total of the wood resources available in the upper northeast region is approximately 600,000 cubic metres.
Of this total resource, only the pulpwood from native forests and private property would be directed to the recovery mill to recover sawn wood products. This assumes the bulk of pulpwood sourced from hardwood plantations on the north coast in the next 10 years will not generate solid wood products. In addition, sawmill residues would be sent directly to the export port. Therefore, approximately 450 cubic metres would potentially be available to a centralised recovery mill with a chipper facility in the upper northeast region (240 m^3 in timber catchment 1 and 210 m^3 from timber catchment 2). For the purpose of strategic analysis, this study assumes that 90% of pulpwood and sawmill residues meet export woodchip quality standards. This

adjustment would still provide at least 400 cubic metres of suitable resource within the region. There is clearly sufficient resource for a export woodchip operation through a northern port.

The potential for a centralised chip facility with recovery mill is limited largely by the cost of pulpwood haulage to the selected site and the cost of woodchip haulage to an export port. The greatest concentration of hardwood pulpwood logs in the two northeast regions is found in the timber catchments around Grafton and Kempsey. However, the distance from Grafton to Brisbane is close to 300km, and woodchip resources between these two centres would be transported across the same area twice at significant cost (8-10 cents per km per m^3). The area around Lismore and Casino is closer to Brisbane and the expanding hardwood plantation resource, which will provide increasing volumes of pulpwood. Casino might provide a better location on account of being on the direct train line between Grafton and Brisbane. A centralised facility in this area could still access the woodchips resources in the Grafton timber catchment.

To initiate exports from Brisbane, at least 200,000 tonnes of woodchips meeting or exceeding export quality standards would be required. The analysis of this option is based on industry development with the following specifications:

- Resource supply: 300,000 m^3/year pulpwood of species suitable for export
- Recovery mill input: 10% of resource supply
30,000 m^3
- Sawntimber output: 25% recovery from mill input
7,500m^3/year
- Woodchip input: 270,000 m^3
- Woodchip output: Assume 10% losses
plus 40% return from recovery mill wood
255,000 m^3/year

Given the information resources provided and the scope of this project, it is only possible to identify delivered wood costs at a strategic planning scale. On this basis, Table 8c shows estimated volumes and delivered wood costs for hardwood pulpwood supplies to a facility located near Casino.

It must be stressed that potential sources of increased export woodchip volumes need to meet the stringent export quality standards, and with the advent of large global resources of homogenous plantation pulpwood, these standards are gradually being lifted over time. In summary, pulpwood volumes do not equate to potential woodchip volumes. For the purpose of strategic analysis, this study assumes that 90% of pulpwood and sawmill residues meet export woodchip quality standards. Economic returns would improve with the sale of the woodchip resources that do not meet export quality standards.

TABLE 8C: INDICATIVE WOODCHIP COSTS FROM THE CHIP FACILITY NEAR CASINO

Timber catchment	Volume (m^3)	Delivered cost ($/$m^3$)	Processing Cost ($/$m^3$)	Volume of export chips (m^3)	Ex-chip facility ($/$m^3$)
1	150,000	42	6	135,000	53
2	150,000	52	6	135,000	64

Notes:
1. Delivered wood costs estimates based on logging costs (~$20/$m^3$) + royalty (~$7/m^3) + haulage (average $0.10/km for traditional method)
2. Volumes include estimated volumes available from private property and sawmill residues.
3. Ex-chip facility costs incorporate 10% loss of wood volume.

The cost of a new chip facility on the scale of the above specification would be in the order of $5 million. The processing costs associated with this facility would be in the order of $1 million per year, or $6/m^3 for woodchip outputs.

The cost of establishing a recovery mill to produce green flitches and rough sawn boards would be in the order of $4-5 million, excluding costs of associated equipment which would be part of the normal infrastructure of the chip facility, such as log yard, loaders etc. The operating costs, excluding delivered wood costs, would be in the order of $1 million per year. As for the chip facility, delivered wood costs would be approximately $46/m^3 (average from two catchments). The recovery of sawntimber would be about 25%, generating a sawn equivalent cost is $168/m^3. With processing costs of approximately $120-130/m^3, the cost of producing green flitches and rough sawn boards would be in the order of $290/m^3.

Following chipping and sawntimber recovery at Casino, woodchips could be sent to the port of Brisbane by rail, at a rate of approximately $0.08/km/m^3. For a distance of approximately 175km, this equates to another transportation cost of $16/m^3. Additional costs include handling, loading, port and harbour fees, and associated export taxes. The total of these additional costs is on average $10/m^3.

If another port was constructed on the upper north coast, the haulage distance from Casino or Grafton (similar delivered pulplog costs) may be reduced to, for example, 120km. The haulage costs associated with this distance would be approximately $11/m^3. Table 8d provides total costs to export woodchips from Brisbane or another northern port (in brackets):

TABLE 8D: INDICATIVE TOTAL COSTS TO EXPORT WOODCHIPS FROM UPPER NORTHEAST

Timber catchment	Ex-chip facility ($/m^3)	Transport to port ($/m^3)	Other costs ($/m^3)	Total cost (fob $/m^3)
1	53	16 (11)	10	79 (74)
2	64	16 (11)	10	90 (85)

8.3.3 Returns

The average fob price for woodchips received from Japanese importers over the last two years is AU$150-155 bone dry metric tonnes. Using a ratio of 0.59 (State Forests of NSW 1998), this equates to about $91 per green cubic metre. Considering factors including the current decline in the Japanese economy and industry, Australia's position as a preferred supplier of woodchips, and the ebb and tide of global woodchip price benchmarks, the best estimate of short to medium term prices is that they will remain relatively steady around $91/m^3. Table 8e shows indicative returns from woodchip exports in the upper northeast. It suggests that exporting woodchips, sourced from a centralised chip facility in Casino, through the port of Brisbane is economically viable. If these chips could be exported through another port on the upper north coast, the rates of return would be significantly higher.

TABLE 8E: ESTIMATED RETURNS FOR WOODCHIP EXPORTS FROM UPPER NORTHEAST

Timber catchment	Total costs (fob $/m^3)	Average export price (fob $/m^3)	Returns ($/m^3)
1	79 (74)	91	12 (17)
2	90 (85)	91	1 (6)
Weighted Avg.	85 (79)	91	6 (12)

Returns for sawntimber output from the recovery mill will be dependent on the demand from downstream value adding processors. With production costs of about $290/m^3, this material cannot be sold as pallet material (about $220/m^3 across eastern Australia) without loss. However, downstream processors can utilise this material to manufacture products worth $900+/m^3, and increasing demand is expected for this wood. As opposed to sourcing more logs, downstream processors will obtain greater recovery from flitches, and it is reasonable to assume that haulage distances will be shorter. On this basis, the recovery mill could expect returns in the order of $350-$400/m^3 in the short to medium term.

8.3.4 Resource allocation scenarios

This option is based on utilising the large existing surplus of sawmill residues and pulpwood in the region. In this sense, any reductions in resource supply could be viewed as reducing the dilemma associated with this increasing surplus in the upper northeast. However, options of this nature require a critical mass of wood resources to be economically viable. The worst case situation is where the surplus of volume is so large as to limit industry operations and yet not large enough to be directed into an appropriate and economically viable end use.

The 50% quota supply scenario would reduce the wood volumes available for woodchip exports by approximately 80,000 m^3. The economic returns of this option, which consists of haulage coordination and basic processing, will increase gradually with increasing throughput volumes, as larger volumes absorb overhead costs and economies of scale are exploited. Table 8e indicates that, although there is a margin for profitable returns, this margin is not large. This suggests that any significant decrease in resource could consume the margin reasonably quickly and render this option not economically viable.

The corollary is that increasing resources would improve the economic returns from this option. The 150% and 200% quota allocation scenarios would increase total woodchip resources by about 80,000m^3 and 160,000m^3 respectively. Given the relatively large haulage distances involved and the limitation on fob price increases, it is unlikely that the returns per cubic metre would increase significantly but total returns would increase.

8.3.5 Constraints

Regulatory constraints to increasing woodchip exports should be removed by the signing of the RFA for the upper northeast region. The Commonwealth Government is in the process of removing export controls on unprocessed wood from public and private plantations, after ensuring that codes of practice provide adequate environmental safeguards. The signing of the RFA will also provide removal of controls on exports on hardwood chips and logs from sustainably managed native forests.

8.3.6 Research and development

No additional research and development would be required to undertake this opportunity. This operation would be similar in process, though not in scale, to the Harris Daishowa operations at Eden.

8.4 OPTION 3: HARDWOOD LVL PRODUCTION

8.4.1 Opportunity

As outlined in Part 1, there is an opportunity to produce hardwood LVL in northeast NSW for sales into the domestic market and exports, particularly to Japan. While softwood LVL is cheaper to produce and satisfies most consumer requirements, producers of hardwood LVL may be able to develop a competitive advantage in high strength applications and appearance features. Given its superior strength properties, hardwood LVL could be made in shorter width and depth dimensions, generating advantages in resource utilisation and product features. Hardwood LVL producers may utilise softwood veneers for non-face layers to reduce costs (and vice versa). Hardwood veneers on the faces provide the extra stiffness that exceeds the structural performance of 100% softwood products. Although LVL is used in Australia primarily for structural applications, the Japanese construction industry has shown strong demand for hardwood LVL in non-structural applications.

8.4.2 Commercial scale facilities

To produce hardwood LVL as a primary product to compete with interstate and international supplies of softwood LVL, a new commercial facility in northeast NSW would need to meet or exceed the following specifications (Spelter et. al. 1996; Beca Simons 1997):

- Resource supply: 100,000m^3 roundwood, 30-70cm diam., relatively defect free

  Note: Softwood veneers may be used for non-face layers. A facility of this size may utilise up to 20,000m^3 of softwood logs to supplement hardwood supply.
- LVL production: 60,000m^3
- Usable wastes generated: Green waste, sawdust

8.4.3 Resource availability

Based on current allocations, State Forests of NSW could provide approximately 15,000m^3 of ex-quota veneer plus approximately 18,000m^3 of quota quality logs of veneer standard from the two timber catchments encompassing Grafton / Coffs Harbour and Kempsey. These catchments contain the largest volume of State forest veneer logs in northeast NSW. Based on the assumption that 10% of private property sawlogs in this region would meet veneer standards, another 20,000m^3 may be available. Up to 5000m^3 of veneer from hardwood plantations may be available from the year 2000 onwards. This scenario would provide a maximum total of 58,000m^3. This total is below that required of a world class LVL production facility, even if the producer was to complement the hardwood supply with softwood veneer logs. However, with the resource supply scenario of 200% of current allocations, the veneer resource from State forests could be increased by up to 20,000m^3. This scenario would provide almost sufficient resources within adjacent timber catchments to supply a LVL production facility at the smallest end of world scale production.

It is important to highlight that this option would require all the veneer resources available in the upper northeast region. This option would leave no veneer for existing plywood producers, and would absorb a significant proportion of high-end quota quality logs that would otherwise be processed to produce solidwood products.

8.4.4 Costs

The indicative capital cost associated with the above facility specification is $45-50 million. This facility would employ in the order of 100 employees, working a double shift, 5 days per week. The manufacturing cost, excluding wood, would be in the order of $8 million per year.

Table 8f provides estimates of delivered wood costs under current quota allocations.

TABLE 8F DELIVERED WOOD COSTS FOR WORLD SCALE HARDWOOD LVL PRODUCTION

40,000 m^3 hardwood within 150 km	@ \$85/m^3	\$3,400,000
40,000 m^3 hardwood 150-300 km	@ \$95/m^3	\$3,800,000
20,000 m^3 softwood from Casino	@\$65/m^3	\$1,300,000

Notes:
1. Delivered wood costs estimates based on logging costs (~\$20/m^3) + veneer royalty (~\$40*/m^3) + haulage (average \$0.10/km for traditional method)
2. Delivered wood cost estimates for softwood from Casino district - logging (\$15/m^3) + royalty (\$30*/m^3) + haulage (\$0.10/km x 200 km)

Based on these indicative calculations, delivered wood costs for the specified facility would be in the order of \$9 million per year.

8.4.5 Returns

Compared with information available on more traditional wood products, there is a relative dearth of aggregated data on LVL prices, for either snapshot or time-series analysis. Trade information on LVL is often grouped with plywood or other composite products, making it difficult to identify specific prices for specific products. Furthermore, there is increasing use of LVL as a commodity component of another manufactured item, for example I-beams, and trade information is tracked for the value-added product rather than the individual components.

Prices for hardwood LVL are even more difficult to obtain, as most of the LVL produced in Australia and other major markets, with the notable exception of Japan, is made from softwood veneers. The price for softwood LVL products from distributors in Australia is in the order of \$1200/m^3 (Dindas Lew, pers. coms.). This return can afford a price of approximately \$800-850/m^3 from the mill door. On the assumption that hardwood LVL could command an extra 20% in price on account of its superior strength properties, producers could expect to receive in the order of \$1000/m^3.

Based on the production of 60,000m^3/year, annual returns from hardwood LVL sales would be in the order of \$40 million. The production of LVL would also yield wood residues that could be sold utilised on site or sold to a downstream processor. Combustion of the wood residues for energy cogeneration would be an attractive means of recovering value from these residues, with the process of peeling veneers requiring hot moisture or steam, and many other production components reliant upon a large energy supply.

8.4.6 Resource allocation scenarios

As discussed in section 8.4.3, the development of a world scale LVL production facility in northeast NSW would require at least double the current quota resource allocations. The 200% of current allocations scenario would almost provide sufficient resources for a facility at the bottom end of world scale production levels. The utilisation of all the veneer resources for hardwood LVL would remove the resources currently available to existing plywood producers in the region.

8.4.7 Research and development

The technology to peel eucalypt logs and treat veneers for plywood production is well established in northeast NSW. This equipment appears to be satisfactory for producing short length LVL in narrow dimensions. The construction of long length LVL beams (5 - 25m) requires a specialised lay-up line, including a modern lathe, composer (for random lengths generated by defect removals), and dedicated presses, and is not currently employed in Australia. Tasmania is one state that has undertaken research and trials on producing LVL from Tasmania eucalypt logs. Their results indicate that long length LVL can be successfully manufactured from this resource, and the strength of eucalyptus LVL will be 60% greater than an equivalent grade of Douglas-fir or American pine species (Tasmanian Government 1997). To produce LVL products of larger length and depth dimensions in northeast NSW, further research and development may be required for the native hardwood species.

8.4.8 Facility locations

The largest catchments of hardwood veneer logs surround the townships of Coffs Harbour and Kempsey (lower northeast region). Given that resource availability for this option is marginal, the facility would need to be located on or close to the border of these timber catchments.

8.4.9 Constraints

As previously discussed, the northeast RFA regions would struggle to supply the hardwood veneer allocations required for a world scale LVL production facility, even under the scenario of 200% of current allocations. Another significant constraint is the untested markets for high strength hardwood LVL. The results of this study suggest that hardwood LVL would have superior strength and durability properties over softwood competitors, but there is no significant production or imports of long dimension hardwood LVL in Australia and the price differential is yet to be established.

The economic viability of this option is also dependent on the successful conclusion to research and development work with native species, which may influence project returns through determinations on factors such as necessary technology and resin types and quantities required. Resin is one of the key components of the LVL manufacturing process, and if resin prices continue to increase significantly, they could quickly negate the potential of the product (Schaffler 1995).

8.5 OPTION 4: BIOENERGY PRODUCTION

8.5.1 Opportunity

As previously noted, a fundamental issue for both the upper and lower northeast RFA regions is the appropriate utilisation of wood residues from the harvesting and processing of timber. Many Australian wood harvesting and processing operations are now dependent upon woodchip exports for an economically viable means of disposing of the by-product residues.

An alternative use of wood residues is biomass combustion for energy. This is an attractive option because:

- the quality of wood required is less important than is required by woodchip suppliers;
- the thermal energy and electrical energy generated may be used on site to drive the facility operations;
- the net electrical energy generated can be sold to other consumers directly or indirectly through electricity grids; and,

- the practice of generating and utilising renewable energy may satisfy altruistic and/or public relation objectives.

Bioenergy production from wood offers the opportunity in northeast NSW to provide a use for the large surplus of sawmill residues and pulpwood that are often currently wasted. The large variability in wood quality, due to the diversity of species, age classes and silvicultural practices present less problems for bioenergy production than other uses requiring homogeneity. Furthermore, many forest industry operations are relatively remote from large regional services, and are therefore ideally placed to benefit from on site energy production.

8.5.2 Commercial scale facilities

Bioenergy production from wood can be undertaken commercially on a range of scales. Option 1 identifies the potential for using micro-turbines generating 0.2 MW, which should be appropriate for applications in small to medium processing facilities (Fung 1998). However, a facility designed specifically to capture the bioenergy potential of wood wastes from an adjacent larger processing activity, such as sawmilling or LVL production, or group of processors would need to meet or exceed the following specifications:

- Resource Supply: 100,000 green tonnes of wood wastes
- Energy output: 10 MW electric power
20 MW thermal energy

8.5.3 Resource availability and facility locations

The development of this option may create competition for woodchips that are currently or planned for export to Japan. However, there is an opportunity for these two operations to co-exist harmoniously, as the bioenergy facility could take woodchips that are outside the maximum haulage distances to an export port, or do not meet export quality standards, which are becoming increasingly stringent.

The critical issue for bioenergy production is the cost of transporting the raw supply to the facility. This option provides a narrow margin for adding profitability, particularly in Australia, where renewable energy suppliers must compete with relatively cheap energy generated from extensive fields of premium brown and black coal. Taking into account the woodchip volumes committed to Newcastle, there appears to be three potential locations for a bioenergy facility in northeast NSW, being the timber catchments encompassing Grafton, Walcha and Kempsey.

With regard to the upper northeast RFA region, Grafton would be a suitable location for bioenergy production. This centre accommodates relatively large sawmill and wood processing facilities that should be able to provide significant volumes of sawmill residues.

8.5.4 Costs

Based on experience in Australia and overseas, particularly in North America, the indicative capital cost associated with the above facility specification is AU$25 million (Enecon Pty Ltd 1998). The facility would need to employ approximately 15 persons in addition to transportation. The operating cost, excluding delivered wood costs, would be in the order of $2 million.

The cost of delivered wood is sensitive to the location of the facility and to other commitments existing on wood residues within the supply zone. The minimum cost for roundwood residues from forest operations will incorporate harvesting costs and haulage costs. Sawmill residues may be free to operations that will remove them from the mill, and the only cost is haulage to the production facility. Both sawmill residues and forest residues may also command a royalty or similar cost if there is another market for them, such as gardening applications or export woodchips. For consideration of this option at a strategic scale, this study assumes that wood supplies exist outside the range or over and above the supplies required to satisfy export woodchip contracts. With this assumption, apart from harvesting and haulage costs, there are no extra costs associated with wood supply. Forest owners and managers will derive an additional financial benefit from supplying bioenergy feed, as stands can be thinned or salvaged at no cost, stimulating growth in final crop trees.

TABLE 8G INDICATIVE DELIVERED WOOD COSTS FOR BIOENERGY PRODUCTION

Location	Residue source	Volume (m^3)	Haulage (km)	Delivered Cost ($/$m^3$)
Grafton	Euc sawmill	30,000	85	10
	Euc forest	70,000	150	35

* Unit prices based on average harvesting costs of $20/$m^3$ and haulage at $0.10/$m^3$/km.

Table 8g provides indicative calculations of delivered wood costs for the specified facility in the order of $3 million, and the total costs of operations, excluding capital investments, would be approximately $5 million per year.

8.5.5 Returns

An economic assessment of returns from bioenergy production options should consider both the ‘grid price’ and the ‘consumer price’. The grid price is the price a bioenergy producer could sell electricity into the grid for dispersed consumption. This price in Australia is dictated by intense competition between the relatively large companies producing energy from brown and black coal, and may at times drop below the cost of production, which is currently in the order of 2-3 cents per kWh (TransGrid 1998). It is unlikely that renewable energy could ever be produced for the same price (or less) as fossil fuel based energy. However, government incentives to encourage use of renewable energy, as discussed in Part 1, are providing marginal opportunities at least for producers to provide their services to environmentally conscious consumers. Various energy suppliers are now advertising ‘Green Power’ to customers with premiums in the order of 2-4 cents per kWh, or between 10% and 30% more than coal based supplies (SEDA 1998). Significant resources of renewable energy, including biomass, wind and small hydro generation, are now being produced at costs in the range of 6 to 10 cents per kWh (Crawford-Smith 1998). To meet the requirements of Federal and State Governments, energy retailers will be looking to purchase larger quantities of renewable energy at grid prices in the order of 6-8 cents per kWh.

The second set of returns is derived from differences between the cost of producing bioenergy on-site and purchasing electricity from the grid. While the grid price for renewable energy may be about 7-8 cents per kWh, industrial consumers purchase electricity at a price of about 10-12 cents per kWh. If an industrial producer can supply their own energy, either electricity or cogenerated heat or steam, for onsite operations, they could potentially save 2-5 cents per kWh used. A medium sized sawmilling operation (25-30,000 m^3/year) may utilise 1,500kWh, and would reduce operating costs by up to $40 per hour for each hour of operation (taking account of the grid fee charged even if consumption is reduced). These types of savings would be generated by either small or large scale energy operations.

8.5.6 Resource allocation scenarios

The impact of different resource supply scenarios on this option would be similar to the impacts on woodchip exports through a northern port (see section 8.3.5). While any reductions in supply would reduce the surplus of wood for which these options are designed, these options require a critical mass of volume for their economic viability. Economic returns would increase with increasing wood resources.

For economic viability and maximum industry benefits, the primary feed for bioenergy production should be low value sawmill residues. For this reason, the viability of bioenergy production may be more dependent than woodchip exports on quota sawlog allocations to sawmills. The latter option can generate higher returns to cover the higher costs of pulpwood supplies from native forests and the developing plantation estate.

8.5.7 Research and development

The combustion of wood biomass for energy is common practice in Europe and the USA, with many examples available for reference (e.g., Puhakka, M. 1997; Anson et. al. 1993; DeBlaay 1994). CSIRO has recently developed "fluid bed carbonisation" technology for the controlled combustion of residues for energy and carbon products. This technology has performed successfully at the pilot plant phase, and is ready for application in northeast NSW.

8.5.8 Other issues

In North America, bioenergy production facilities are often built adjacent to or near one or more processing sites, with the primary objective of supplying these sites with all or most of their energy requirements from their own sawmill wastes. This has the significant benefits of a relatively secure wood resource with very low haulage costs and an almost captive market for the bioenergy generated. The opportunity to gain these benefits in northeast NSW is somewhat limited by the relatively large distances between relatively small sawmills, though this opportunity should not be discarded during the structural reform process. It would complement the development of value added processing nodes suggested as likely for the hardwood sawmilling industry.

8.6 OPTION 5: CHARCOAL & ACTIVATED CARBON PRODUCTION

8.6.1 Opportunity

The Forestry and Forest Products Division of CSIRO has developed sophisticated technology for the production of charcoal and activated carbon from wood and wood processing residues. This technology has been tested at pilot plant scale, with results that suggest commercial scale plants in Australia would be economically viable.

This opportunity is particularly attractive in northeast NSW, as it would capitalise on the dense timber species growing in the region, and use sawmill residues and low grade logs to provide higher value products in demand by Australian and international markets. In addition, the production of charcoal and activated carbon can be built up flexibly and progressively in modular units to suit availability of feedstocks, capital and product requirements, thus minimising the risks associated with a new venture. Furthermore, this option is less dependent on large volumes of resources, being based primarily on the use of sophisticated technology to extract maximum value from the resource.

8.6.2 Commercial scale facilities

The exact configuration of the plant would be determined by the quantity and nature of its feedstock, the preferred product range, and the energy utilisation to occur in parallel with charcoal and activated carbon production. To enable a general review of costs and returns a typical plant is defined as follows:

• Resource supply:	22,000 tonne/year of wood residues, as woodchips or sawmill residues.
• Charcoal production:	2,750 tonne/year
• Activated carbon production:	1,500 tonne/year (using charcoal as feed)
• Energy production:	up to 5 MW available as heat energy

(Enecon Pty Ltd 1998)

8.6.3 Facility locations

Australia currently exports more than 60,000 tonne/year of charcoal for metallurgical and cooking use, largely produced from coal. The limiting factor in timber charcoal exports was found to be the lack of reliable supplies of consistent quality from the traditional charcoal burners.

Given that this option has a relatively high export potential, it would be desirable to site the operation close to an export port. In addition, this operation requires a steady flow of residual wood feed, a low grade product that does not afford long transport distances. Ideally, a charcoal and activated carbon production facility would be located close to a port and a consolidated grouping of forest operations or sawmillers. As most industrial centres of the upper northeast are a relatively long distance from the port of Brisbane (see section 8.3.3), the area around Casino and Lismore would provide the most favourable site to begin a progressive industry in the upper northeast. There are currently no commitments on the large surplus of residual wood supplies in this area. There is a possibility that an woodchip export operation could bid for a substantial proportion of this resource (see section 8.3). However, the charcoal and activated carbon production facility described above requires a relatively small volume of feedstock, and generates products of much higher value than woodchips.

8.6.4 Costs

Indicative capital costs (Enecon Pty Ltd 1998) associated with several plant options are summarised below:

Option		
1	Cost of plant producing 2,750 tonne/year of charcoal from 22,000 tonne/year wood	$2.5 million
2	Cost to double capacity of this plant to produce 5,500 tonne/year charcoal from 44,000 tonne/year wood	$1 million
3	Cost of adding an activated carbon plant to produce 1,500 tonne/year granular and pelletised carbon from 2,750 tonne/year charcoal	$3-4 million
4	Cost of adding a further 1,500 tonne/year activated carbon production	$1-2 million

To allow continuous supply of energy and maximum use of equipment, plant operation is normally considered on a 24 hour/day basis, requiring four or five shifts overall. This has a significant impact on operating costs for small plants and favours processing at least 25,000 tonne wood/year. Sharing personnel with an adjacent sawmill or other plant will help reduce labour costs. The basic facility would employ about 10 persons, and would have operating costs, excluding delivered wood costs, in the order of $1 million per year.

The cost of delivered wood is sensitive to the location of the facility and to other commitments existing on wood residues within the supply zone. The minimum cost for roundwood residues from forest operations will incorporate harvesting costs and haulage costs. Sawmill residues may be free to operations that will remove them from the mill, and the only cost is haulage to the production facility. Both sawmill residues and forest residues may also command a royalty or similar cost if there is another market for them, such as gardening applications or export woodchips. For consideration of this option at a strategic scale, and given the initial operation requires relatively small volumes of wood, it is expected that charcoal and activated carbon feed can be sourced from residue supplies over and above other demands. Therefore, apart from harvesting and haulage costs, there are no extra costs associated with wood supply. Forest owners and managers will derive an financial benefit from supplying wood resources to this option, as stands can be thinned or salvaged at no cost, stimulating growth in final crop trees.

Table 8h shows that delivered wood costs to a production facility near Casino would be in the order of $750,000 per annum.

TABLE 8H: INDICATIVE DELIVERED WOOD COSTS FOR CHARCOAL AND ACTIVATED CARBON PRODUCTION

Location	Wood source	Volume (m^3)	Haulage (km)	Unit ($/$m^3$)
Casino	Euc sawmill Euc forest	5,000 20,000	85 150	10 35

Unit prices based on average harvesting costs of $20/m3 and haulage at $0.10/m3/km.

8.6.5 Returns

The sales revenue can be estimated based on current product prices:

TABLE 8I: INDICATIVE RETURNS FROM CHARCOAL AND ACTIVATED CARBON PRODUCTION

Product	Average Market Price	Annual Revenue
1,500 tonne of activated carbon for gold and water industries	$2000/tonne	$3,000,000
2,750 tonne charcoal (wholesale for export)	$500/tonne	$1,400,000
5MW Heat energy	$4/GJ (value for natural gas)	$600,000

Source: Enecon Pty Ltd 1998

For the complete and upgraded facility, as per above specifications, producing all these products, annual revenue would be in the order of $5 million per year.

8.6.6 Resource allocation scenarios

In contrast with the woodchip export and bioenergy production options, this option requires relatively small volumes of residual wood, and different resource supply scenarios would not dramatically affect its economic viability.

8.6.7 Research and development

The CSIRO technology for charcoal and activated carbon production is now at a stage where process optimisation for particular wood species can be carried out on a pilot plant, and this data used to confirm the design details of a commercial scale facility.

8.6.8 Constraints

The integrated production of charcoal and activated carbon from wood wastes, using sophisticated technology for process integration and maximum energy recovery, is relatively new to Australia, and has not yet been employed at an industrial scale. Although research work by CSIRO indicates that commercial success from industrial scale production is possible, a new production facility for northeast NSW would involve a ‘breaking ground’ project, requiring strong investor confidence.

9. CONCLUSIONS

The options outlined in this study illustrate there is a range of viable industry development options for the forest industry in the upper northeast RFA region. If implemented these options would see the development of value adding nodes for the hardwood sawmilling industry incorporating continued development of the existing plywood and veneer industry. These nodes would allow smaller mills specialising in green sawntimber production to sell to other mills for further processing as well as facilitating the development of integrated value adding operations. The value adding mills would produce a range of outputs emphasizing appearance and other high value products. While there is an option for production of laminated veneer lumber (LVL), a world scale LVL mill would require more resources than are currently available.

In addition, there are opportunities to utilise the current large surpluses of sawmill residues and pulpwood. These opportunities offer scope to increase returns to existing operations as well as enhance forest management practices. Options for utilising these surpluses include potential development of a woodchip export mill, production of electricity and heat through bioenergy facilities, and development of charcoal and activated carbon production with new technologies from CSIRO.

Construction of a woodchip export mill around Grafton or Casino would be based on shipping its product either through Brisbane or through a new export port established in the region. The latter is likely to be more viable given the haulage distance to Brisbane. The establishment of bioenergy facilities offers the advantage of being adaptable to small scale mills and can provide sources of electricity as well as heat for drying kilns as part of even relatively small mills. This small scale technology is still developing in Australia and a current study by the Sustainable Energy Development Authority (SEDA) in NSW is examining particular sites where both large and small scale mills could be viable. There is an opportunity for a larger scale bioenergy facility to supply both heat and energy to either larger mills or to the value adding processing nodes.

These development opportunities can be expanded if resource levels are increased. However, the nature of the volume increases would be very important to determining the impacts on industry development options. For example, if the increase was to come from higher value stands of timber it is likely that this would allow an expansion of the sawmilling and plywood/veneer sector and possibly support a large scale LVL mill. On the other hand, a large expansion in pulpwood could be absorbed within those options that have already been identified. For instance, the establishment of OSB and MDF mills would not appear to be viable regardless of the availability of increased volumes. Similarly, even at the 200% option it is not clear that a pulp mill would be viable. It is thus suggested that an expansion in resources available would not alter the type of options identified for the upper northeast region.

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PART 3:

LOWER NORTHEAST RFA REGION

11. INTRODUCTION

The purpose of this report is to detail selected industry development opportunities for the lower northeast RFA region of NSW. The options relate to value adding, transformation, and expansion opportunities, and stem from a review (Part 1) of the wood and wood products industry in both the upper and lower northeast RFA regions. This review included analysis of forest resources, existing industry structures, industry competitiveness and market opportunities.

This report provides an assessment of these options and the basis for inputs to FORUM, an economic model run by ABARE for the economic assessment component of the RFA development process. Results of the FORUM analysis will be used in conjunction with non-economic factors to determine the full impact of various resource availability scenarios being considered during the development of an RFA for the lower northeast region.

12. INDUSTRY DEVELOPMENT OPTIONS

12.1 OVERVIEW

The lower northeast RFA region is defined in Annex 1 of the Part 1 report. The current structure of the wood and wood products industry in this region is outlined in Table 12a.

TABLE 12A: INDUSTRY PROFILE: LOWER NORTHEAST RFA REGION

Processing facility	No.*	Comments
Sawmill (<1000 m3)	43	Conventional sawmills Scattered across region
Sawmill (<10,000 m3)	24	Conventional sawmills, with some value adding equipment, eg. dry kilns and planer Scattered across region
Sawmill (10-30,000 m3)	14	Some conventional sawmills Also Bandsaw mills with drying kilns and moulders, laminating and finger-jointing equipment
Sawmill (30,000+ m3)	3	Larger processing facilities, with all value adding equipment listed above. These facilities located at Herons Creek, Walcha and Dorrigo.
Hardboard	1	Mill at Raymond Terrace currently producing approx. 30,000m3
Export woodchips	1	Large facility at Kooragang Island near Newcastle, currently exporting approx. 200,000m3 p.a.
Totals	86	

* Number of mills of specified intake capacity based on volumes supplied by State Forests of NSW in 1996/97. Some mills utilise significant proportions of timber from private property (in some cases, their own).

In many regards, the upper northeast and the lower northeast RFA regions have similar characteristics. As discussed in the combined review (Part 1), these characteristics include a relatively fragmented and diverse forest resource and a similarly fragmented and diverse wood products industry built on relatively small sawmills. However, there are also some key differences between the wood products industries of the two regions. The **lower northeast region is unique** for reasons that include:

- there is existing infrastructure to enable commercial use of woodchips, primarily through the export port near Newcastle and the hardboard production facility at Raymond Terrace;
- the softwood estate at Walcha provides a relatively large, consolidated wood resource, most of which is not committed to any processing facility at this time;

- there are no plywood or veneer based product producers in the region, and the available veneer resources, albeit relatively small, are not sent to the upper northeast processors on account of prohibitive haulage costs.

As for the upper northeast region, there is a need to address the structural adjustment required of the hardwood sawmilling industry in light of recent reductions in resource allocations and changing nature of the resource. There is also the possibility of increasing woodchip exports through the port of Newcastle.

Another key issue is the utilisation of the Walcha softwood resource. This resource could provide for world scale softwood LVL production. It could also provide resources for bioenergy production, which can be economically viable on a range of scales, thereby providing an opportunity for an integrated processing facility. The variable quality of the Walcha resource and its distance from other industrial centres encourage options that can utilise all grades and dimensions of wood resources.

There is also the opportunity to produce charcoal and activated carbon production from wood residues. This option is relevant to both the upper and lower northeast regions. CSIRO has recently developed this process using ‘fluidised bed combustion’, and successful results have been achieved from pilot plant tests. This option is particularly attractive in northeast NSW, as it is less dependent on large volumes of resources, being based primarily on the use sophisticated technology to extract maximum value from the resource. In addition, the production of charcoal and activated carbon can be built up in modular units, flexibly and progressively to suit availability of feedstocks, capital and product requirements, thus minimising the risks associated with a new venture.

The most likely industry development options for the lower northeast region appear to be:

- continued development of hardwood sawmilling sector around processor ‘nodes’;
- increase woodchip exports through the port of Newcastle;
- centralised softwood LVL production;
- bioenergy production; and
- charcoal and activated carbon production.

12.2 OPTION 1: HARDWOOD SAWNTIMBER VALUE ADDING DEVELOPMENTS

12.2.1 Opportunity

As outlined in Part 1, the hardwood sawntimber industry, both nationally and in northeast NSW, is already undergoing significant change emphasizing the production of higher value products. The development of new technologies and products is extending this development to smaller logs and leading to greater utilisation (higher recovery rates) of hardwood logs. These changes reflect market and other pressures focused on extracting maximum value from forest resources that have reduced in quantity and quality. The impact of these changes in northeast NSW is compounded by the diverse and fragmented nature of the forest resources, with an equally diverse and fragmented industry infrastructure based on these resources. The forest industry in the region needs to expedite this development to capitalise on medium term opportunities from integrated, value adding operations.

It is expected that the moves already underway to increase the proportion of value adding processing across the industry will continue to develop and that as the number of individual mills decline, centralised processing 'nodes' will develop across the region. These nodes would draw on wood resources from forest owner allocations and processed wood products provided by other suppliers. The extra allocations from other processors would boost throughput required to afford investment in technology and training for further value added processing. Downstream processing of boards may include kiln drying, glue-lamination of small end section material, veneer slicers for appearance grade products, and the manufacture of parquetry and furniture components.

This development would provide economic benefits for the downstream processor. It should also provide significant benefit for processors upstream, who are currently achieving only marginal returns or losses on preliminary wood processing operations, and do not have the throughput to justify additional investment. These processors could expect higher prices for their products from the downstream processor, who would afford to pay more than consumers of green sawntimber as they will generate products of much higher value.

Given the fragmented nature of the resource, and relatively high costs of wood transport, the location of value adding processing nodes is consistent with the success of this industry structure. In the lower northeast RFA region, the most likely sites for these nodes are the areas in close proximity to Kempsey, Walcha-Nundle and Gloucester/Bulahdelah. These three areas are central to relatively large concentrations of forest resources, and the industrial facilities associated with towns of this size, including good transportation networks.

The nature of development of the hardwood sawntimber industry is different from most other options, which relate to specific or relatively discrete operations that can be clearly defined and costed. The future development of the hardwood sawntimber industry relates to a process of incremental industry transformation, which will, and should, happen gradually over the next five to ten years, with the actual speed determined largely by resource allocations and market opportunities during that time.

The nature of the foreseen growth and development in the sawntimber industry means that it is not possible to accurately estimate specific costs (and returns) for specific investments by particular mills. However, given the identified market opportunities, growth and development in the hardwood sawmilling sector can be represented by three factors:

- an increase in the proportion of wood that is directed to value adding processes;
- an increase in the rates of recovery of various products across the range of wood processed in hardwood sawmills in the region; and
- an increase in the average price for value added hardwood sawntimber products.

The further development of value adding processing nodes could include the installation of the following processes:

- sawing capacity for 'smalls' and 'super smalls' (<15cm sed)
- kilns – solar, electric, or heat from cogeneration of energy from biomass combustion;
- hardwood veneer slicer for appearance grade veneers;
- finger jointing and glue lamination lines for small end dimension material; and
- moulding and millwork lines for manufacture of furniture and decorative feature pieces.

12.2.2 Costs

For the reasons discussed above, value adding investment costs will be spread across a range of investments and across a number of mills as well as over time. Many of the potential technologies can vary in scale depending on the volumes being processed by a mill. These investments will incur a wide range of capital and operating costs. For instance, the establishment of a new hardwood veneer slicer and drying facility would cost in the order of $5 million, with variations dependent on existing equipment. Conventional kilns with a drying capacity of $50m^3$ currently cost in the order of $150,000 each for a ready-to-dry assembly, with significant increases in energy requirements. Solar kilns vary in capacity and price, but an example from the region has a capacity of 8-10 m^3 capacity and costs approximately $25,000, and requires relatively little extra energy (FORTECH 1994).

For these reasons, costs are not identified for specific investments. Rather, it is proposed that indicative industry developments be represented by changing industry returns likely to stem from industry wide movements in value adding and associated recovery rates.

12.2.3 Returns

Estimating returns from future development of the hardwood sawntimber industry is complex. Given the future development opportunities that have been identified, economic returns are likely to increase as a result of a combination of factors. These include increasing the proportion of wood directed to value added products (both in mills where primary processing occurs as well as by sales from smaller mills to mills in value adding nodes), increasing sawntimber recovery, and increasing the average price for value-added products higher, that is, producing products with a higher ratio of product price to costs.

It would be a highly complex task to represent these changes across the region, one that would require detailed estimates of individual mills and their future investment plans. As this level of information is not available the potential future impacts are indicated through the application of an across the board representation of increased value adding. This is represented in Table 12b by increasing the proportion of various log categories that are directed to value adding outputs.

The estimates provided in Table 12b assume that value adding is represented by any processing beyond green sawn with an appropriate increase in product value (assuming this exceeds costs). Further, increased proportions of products going to value adding are assumed to provide returns commensurate with average prices. Based on these assumptions, Table 12b shows the increase in returns likely to stem from continued development as described. This table attempts to provide estimates of these returns from realistic value adding ‘targets’ based on the existing infrastructure and consultation undertaken during the course of this study. This simple illustration does not incorporate the cost reduction benefits derived from increasing efficiency in wood flows and economies of scale. Neither does the illustration account for the economic benefits gained from enhanced integration of the wood processing industry, with increased opportunities to market larger volumes of products of consistent dimension and quality. The scale of these potential benefits is directly linked to the scale of industry integration and the development of the nodes, and as such, will be realised incrementally over time.

Table 12b illustrates indicative returns that could be generated by future development of the hardwood sawmilling industry in the lower northeast region at current resource levels. These types of gains could also be increased by expansion of the resources made available to the industry.

TABLE 12B: POTENTIAL RETURNS FROM INCREASED VALUE ADDING PROCESSING OF HARDWOOD RESOURCES

Estimated returns from current value adding practices

Resource	SFNSW	Recover 40%	Current VA%	$ Primary	$ Value adding	$ Totals		$/m^3
Quota	139,000	55,600	55%	13,761,000	27,522,000	41,283,000	Primary Quota	550
Small	21,000	8,400	60%	1,512,000	4,536,000	6,048,000	Small	450
Ungraded	76,000	30,400	8%	9,788,800	2,188,800	11,977,600	Ungraded	350
Total $ returns						59,308,600	VA	900

Increased proportion of wood to value adding practices

		Recover 40%	Target VA%	$ Primary	$ Value adding	$ Totals		$/m^3
Quota	139,000	55,600	70%	9,174,000	35,028,000	44,202,000	Primary Quota	550
Small	21,000	8,400	70%	1,134,000	5,292,000	6,426,000	Small	450
Ungraded	76,000	30,400	30%	7,448,000	8,208,000	15,656,000	Ungraded	350
Total $ returns						66,284,000	VA	900

Increased value adding and sawntimber recovery

		Recover 55%	Target VA%	$ Primary	$ Value adding	$ Totals		$/m^3
Quota	139,000	76,450	70%	12,614,250	48,163,500	60,777,750	Primary Quota	550
Small	21,000	11,550	70%	1,559,250	7,276,500	8,835,750	Small	450
Ungraded	76,000	41,800	30%	10,241,000	11,286,000	21,527,000	Ungraded	350
Total $ returns						91,140,500	VA	900

Increased value adding, sawntimber recovery, and average price for value-added products

		Recover 55%	Target VA%	$ Primary	$ Value adding	$ Totals		$/m^3
Quota	139,000	76,450	70%	12,614,250	64,218,000	76,832,250	Primary Quota	550
Small	21,000	11,550	70%	1,559,250	9,702,000	11,261,250	Small	450
Ungraded	76,000	41,800	30%	10,241,000	15,048,000	25,289,000	Ungraded	350
Total $ returns						113,382,500	VA	1200

12.2.4 Resource allocation scenarios

In the course of structural adjustments following the Forest Reform package of 1996, sawmilling companies of various sizes have closed their mill facilities and/or downsized to cope with the substantial reductions in resource allocations. Participants at the forest industry workshop in Grafton (see Part 1) gave the clear message that any further reductions in resource allocations would result in the accelerated decline of sawmill numbers across the upper northeast and lower northeast regions. Many sawmills still operating appear to be on the brink of economic viability, and are dependent on sustained or increased throughputs for survival.

The 50% scenario would therefore dramatically change the location and shape of the sawmilling industry in northeast NSW. However, those sawmills that survive the transition would almost certainly pursue the further development of value adding processor nodes. With reduced throughputs, all sawmills would have even fewer returns to cover capital investment in value adding equipment and marketing programs. Sawmilling companies would be forced to focus their efforts primarily on cost reductions through increased efficiencies, and pool their low cost products with other suppliers to create the critical mass required for the development of value added products. Developments in this direction would be hampered by the cost of transportation and other overheads, which increase in impact as the product volumes fall and the distance between viable industrial centres grow.

Increases in resource supply are likely to provide greater insurance for capital investment in value adding equipment and marketing programs. Where tight operations may be limited to the development of a select range of products, extra supply volumes provide an opportunity to expand into new product lines, increasing the flexibility and stability of the industry. However, the nature of the volume increases will be an important factor determining the proportion of wood directed into value adding products.

12.2.5 Research and development

There are no substantial technical obstacles presented by the proposed development of the hardwood sawntimber industry at this stage. Northeast NSW already has the expertise, and in some cases, installed capacity, to further develop increased value adding and recovery rates identified. Some of the options may require some additional research and development into sawing technologies. CSIRO and industry stakeholders have already begun this work, notably the sawing and drying of small and super small logs, cogeneration of energy from biomass combustion, and the slicing of veneers from selected eucalypt species. Progress on this work can and will increase as investor interest increases in the region.

12.2.6 Constraints

As discussed in Part 1, the major constraint on future development of the hardwood sawntimber industry is likely to be the availability of suitable resources. This will affect the number of processors as well as the number of value adding ‘nodes’ that are likely to be sustained. However, a framework of four to six value adding processor nodes receiving 50-60% of sawntimber appears to be appropriate for all of the supply scenarios considered in this study. It is important to note that green sawntimber still has a niche market that should not be overlooked, and there will be opportunities for millers of green sawntimber in the evolving industry structure.

12.3 OPTION 2: INCREASE WOODCHIP EXPORTS THROUGH NEWCASTLE

12.3.1 Opportunity

In the absence of other operations utilising wood residues, the export woodchip trade continues to provide attractive returns from pulplogs, despite the recent and dramatic devaluation in the Japanese economy. As noted in Part 1, Australia is the only supplier selling woodchips in its own currency, and the depreciation of the Australian dollar with the yen has meant that Australian woodchips have not increased in price for the Japanese. In addition to economic returns, an increased market for pulpwood would significantly enhance native forest and plantation management by facilitating thinnings.

There are two options for increasing woodchip exports from northeast NSW: increase the volume exported through the port at Newcastle; or, commence woodchip exports from a northern port, with the only other established port within viable haulage distances being Brisbane. With regard to woodchip resources available in the lower northeast, increased exports in the short to medium term would need to flow through Newcastle. As opposed to new export contracts, this option may allow for relatively small increases in volumes, subject to negotiation of existing contracts.

12.3.2 Facility location, resource availability and costs

Sawmill Exporters Pty Ltd are currently exporting approximately 200,000 tonnes of woodchips per year to Japan from the port at Newcastle's Kooragang Island. Most of these woodchips are sourced directly from sawmill residues within economically viable haulage distances. In addition, approximately 80,000 tonnes of State forests pulplogs are received and chipped at Boral's Tea Gardens facility in the Bulahdelah district, then transported another 30km to the island's port facility.

As previously noted, increased volumes through Kooragang Island would be subject to negotiation of existing contracts, which would be influenced by existing and forecast needs for additional supplies. While the current state of the Japanese economy limits immediate prospects, the practice of selling in Australian dollars may assist. In any case, delivered wood costs will remain a major determinant of any potential expansion of woodchip exports.

Given the information resources provided and the scope of this project, it is only possible to identify delivered wood costs at a strategic planning scale. Based on current resource allocations, the following are estimated volumes and delivered wood costs to Newcastle for hardwood pulpwood and sawmill residues.

TABLE 12C: INDICATIVE COSTS TO DELIVER WOODCHIPS TO PORT OF NEWCASTLE

Timber catchment	Source	Volumes (m^3)	Chipped	a	b	c	d	Delivered cost ($\$/m^3$)
TC 4,5	Pulplogs Sawmill chips	103,000 29,000	Tea Gardens Sawmills	20	7 15	20 20	6 10	53 45
TC 3,6	Pulplogs Sawmill chips	287,000 68,000	Tea Gardens Sawmills	20	7 15	30 30	6 10	63 55

Notes:
1. Delivered wood costs estimates based on logging costs (~$\$20/m^3$) + royalty (~$\$7/m^3$) + haulage (average $0.10/km for traditional method)
2. Volumes include estimated volumes available from private property and sawmill residues.

a) Average harvesting costs
b) Estimated royalty charges
c) Average haulage costs
d) Estimated processing costs (sawmills include collection and handling fees)

It must be stressed that potential sources of increased export woodchip volumes need to meet the stringent export quality standards, and with the advent of large global resources of homogenous plantation pulpwood, these standards are gradually being lifted over time. In summary, pulpwood volumes do not equate to potential woodchip volumes. For the purpose of strategic analysis, this study assumes that 90% of the volume of wood deliveries are produced as export quality chip.

Following delivery to the port, additional costs include handling, loading, port and harbour fees, and associated export taxes. The total of these additional costs is on average $\$10/m^3$. The following table provides total costs to export woodchips from Newcastle:

TABLE 12D: INDICATIVE TOTAL COSTS TO EXPORT WOODCHIPS FROM THE PORT OF NEWCASTLE

Delivered volumes (m^3)	Costs ($\$/m^3$)	Export Volumes (m^3)	Adjust for loss ($\$/m^3$)	Additional costs ($\$/m^3$)	Total costs (fob$\$/m^3$)
103,000	53	93,000	59	10	69
29,000	45	26,000	50	10	60
287,000	63	258,000	70	10	80
68,000	55	61,000	61	10	71

12.3.3 Returns

The average fob price for woodchips received from Japanese importers over the last two years is AU$150-155 bone dry metric tonnes. Using a ratio of 0.59 (State Forests of NSW 1998), this equates to about $91 per green cubic metre. Considering factors including the current decline in the Japanese economy and industry, Australia's position as a preferred supplier of woodchips, and the ebb and tide of global woodchip price benchmarks, the best estimate of short to medium term prices is that they will remain relatively steady around $91/m^3.

Based on the indicative calculations of total costs, this study indicates that there is a profit margin range of $10-30/m^3 for export woodchips sourced from sawmills and pulplogs in the lower northeast timber catchments. It must be noted that a significant proportion of these resources is currently committed to SEPL and CSR's hardboard plant. However, subject to negotiation of existing contracts, any increases in woodchip supply should provide a significant return for the lower northeast forest industry.

12.3.4 Resource allocation scenarios

This option is based on expansion of an existing operation that has the capacity to absorb an expansion or a contraction in resource supply. If quota allocations were reduced by 50%, pulpwood supplies from native State forests would decrease by approximately 15% and sawmill residues will fall accordingly. The lower northeast region would still generate approximately 400,000 tonnes of residual wood each year, which should at least sustain current woodchip exports subject to economically viable haulage distances. However, this scenario would decrease the profitability and almost certainly remove any opportunity for increasing exports through the port of Newcastle. It would also further undermine Japanese confidence in Australia's ability to maintain regular supplies of native forest woodchips.

The 150% and 200% of current resource allocation scenarios would provide additional profitability and potentially support the guaranteed supply of another discrete parcel of woodchips. The latter scenario would provide another 150,000 tonnes from native State forests across the lower northeast region, and an increase in sawmill residue volumes in the order of 60,000 tonnes. Taking into account haulage distances from remote parts of the region, this may provide sufficient resource to guarantee the supply of another 100,000 tonnes of export woodchips per year. With an existing operation based on the excellent facilities at the port of Newcastle, this scenario would represent a significant contribution to the regional economy.

12.3.5 Constraints

Regulatory constraints to increasing woodchip exports should be removed by the signing of the RFA for the upper northeast region. The Commonwealth Government is in the process of removing export controls on unprocessed wood from public and private plantations, after ensuring that codes of practice provide adequate environmental safeguards. The signing of the RFA will also provide removal of controls on exports on hardwood chips and logs from sustainably managed native forests.

12.3.6 Research and development

No additional research and development would be required to undertake this opportunity.

12.4 OPTION 3: WORLD SCALE SOFTWOOD LVL PRODUCTION

12.4.1 Opportunity

Small volumes of short length laminated veneer lumber (LVL) are produced in the upper northeast RFA region of NSW. There would appear to be an attractive opportunity to produce longer length LVL for sales into an increasing domestic market, currently supplied by only one domestic producer, located in South Australia, and imports from North America. Softwood LVL is cheaper to produce than hardwood products, and can satisfy almost all the strength and durability characteristics required by current markets. The most competitive LVL production opportunity would be one based on a large, consolidated softwood resource. This criteria selects the State forests' *Pinus radiata* plantation in the Walcha-Nundle area for consideration of this option.

12.4.2 Commercial scale facilities

To produce softwood LVL as a primary product to compete with interstate and international supplies, a new commercial facility in northeast NSW would need to meet or exceed the following specifications:

- Resource supply — 80,000 m^3/year roundwood, 30-70cm diam., relatively defect free
- LVL production — 40,000 m^3/year
- Usable wastes generated — green waste, sawdust

12.4.3 Resource availability and costs

With regard to the Walcha-Nundle location, the consolidated *P.radiata* estate would provide most of the wood resources required. Not all of the available sawlog resource would meet sufficient grade for LVL manufacture. Approximately 60% of the Walcha-Nundle estate was planted in the 1960s and 1970s, and did not receive the attentive silviculture, particularly thinning, afforded to the stands planted from 1981 onwards. For this reason, the older stands may produce timber with a higher proportion of spikes and knots. While opinions vary over quality and quantity of the resource, it is considered the estate could provide 80,000 m^3 of sawlogs suitable for LVL production. Potential investors would need to closely investigate the variability in quality, and determine whether the critical mass meets or exceeds quality standard requirements.

Assuming that all the softwood veneer logs, and possibly some hardwood veneer logs to supplement supply, could be accessed from within 85 km of the production facility, the delivered wood costs would be in the order of \$70/m^3, or approximately \$5,600,000 per year. This indicative cost is based on an average royalty of \$40/m^3 for softwood veneer logs and harvesting costs of \$20/m^3.

Based on these indicative calculations, delivered wood costs for the specified facility would be in the order of \$13 million per year.

The indicative capital cost associated with the above facility specification is \$45-50 million. This facility would employ in the order of 130 employees, working a double shift, 5 days per week. The operating cost, excluding delivered wood costs, would be in the order of \$8 million per year.

12.4.4 Returns

Domestic consumption of softwood LVL appears to be increasing steadily, supported by significant expansions in production by Australia's only producer, Carter Holt Harvey. However, a new large scale operation would face considerable competition from smaller companies with integrated operations, the established market presence of Carter Holt Harvey's LVL production in South Australia, and imports from very large scale operations in North America. However, if the facility meets or exceeds the "world scale" specifications above, and is managed effectively with due regard for quality and efficiency, there is no apparent reason why LVL produced at Walcha-Nundle could not succeed in markets for structural products used in the construction industry between Sydney and Brisbane.

The price for softwood LVL products from distributors in Australia is in the order of \$1200/m^3 (Dindas Lew 1998), depending on specific products and existing markets. This return can afford a price of approximately \$800-850/m^3 from the mill door. Based on the production of 40,000m^3/year, annual returns from hardwood LVL sales would be in the order of \$32 million. The production of LVL would also yield wood residues that could be sold utilised on site or sold to a downstream processor. Combustion of the wood residues for energy cogeneration would be an attractive means of recovering value from these residues (see Option 5 "Bioenergy Production"), with the process of peeling veneers requiring hot moisture or steam, and many other production components reliant upon a large energy supply.

12.4.5 Resource allocation scenarios

As this option is based on an existing plantation resource, different resource allocation scenarios would not directly impact its economic viability.

12.4.6 Research and development

No additional research and development would be required to undertake the opportunity.

12.4.7 Constraints

Unlike most other industry development options for northeast NSW, contractual resource security is not the primary constraint on this option. Instead, the two key issues are resource quality and markets.

The roads, power, and water resources at Walcha and Nundle are considered adequate for this industry development option (State Forests of NSW 1996).

12.4.8 Other issues

In 1996, State Forests of NSW invited Expressions of Interest for the purchase of 80,000m^3 of sawlogs and 80,000m^3 of pulpwood from its softwood plantations near Walcha. The volume was offered as available for up to ten years with the option to negotiate a rollover for up to a further ten years. After the ten year period a similar volume would continue to be available but the proportion of sawlog would increase.

The outcome of the tendering process was that the combination of the relatively small volume available and the lack of a market for the residual wood stood in the way of an industry establishing in the area (SFNSW 1998). The distance between Walcha-Nundle and other processing sites or export ports exacerbates this problem.

The attractiveness of this development option is therefore strongly influenced by the requirement to take pulplog with the available sawlogs, and/or the existing markets, near and far, for pulplogs and other residual wood products.

12.4.9 Critical success factors

The three key critical success factors for large scale production of softwood LVL at Walcha-Nundle are:

- variability in quality of sawlogs following varying silvicultural regimes;
- world scale cost competitiveness in softwood LVL production; and
- markets for pulplog and residual wood stemming from the operation.

12.5 OPTION 4: BIOENERGY PRODUCTION

12.5.1 Opportunity

As previously noted, a fundamental issue for both the upper and lower northeast RFA regions is the appropriate utilisation of wood residues from the harvesting and processing of timber. Many Australian wood harvesting and processing operations are now dependent upon woodchip exports for an economically viable means of disposing of the by-product residues.

An alternative use of wood residues is biomass combustion for energy. This is an attractive option because:

- the quality of wood required is less important than is required by woodchip suppliers;
- the thermal energy and electrical energy generated may be used on site as a supplementary energy resource to drive the facility operations;
- the net electrical energy generated can be sold to other consumers directly or indirectly through electricity grids; and,
- the practice of generating and utilising renewable energy may satisfy altruistic and/or public relation objectives.

Bioenergy production from wood is particularly attractive in northeast NSW. There is currently only one port used to export woodchips, which is at the extreme southern end of the lower northeast region, and with no other apparent markets, large volumes of wood residues are currently wasted. There is large variability in wood quality, due to the diversity of species, age classes and silvicultural practices, which limits their utilisation for products requiring homogeneity. Furthermore, many forest industry operations are relatively remote from large regional services, and are therefore ideally placed to enjoy the benefits of energy production on site.

12.5.2 Commercial scale facilities

Bioenergy production from wood can be undertaken commercially on a range of scales. Option 1 identifies the potential for using micro-turbines generating 0.2 MW, which should be appropriate for applications in small to medium processing facilities (Fung 1998). However, a facility designed specifically to capture the bioenergy potential of wood wastes from an adjacent processing activity such as sawmilling or LVL production, or to generate bioenergy for supply to a regional electricity grid, would need to meet or exceed the following specifications:

- Resource Supply 100,000 green tonnes of wood wastes
- Energy output: 10 MW electric power
  20 MW thermal energy

12.5.3 Resource availability and facility locations

The development of this option may create competition for woodchips that are currently or planned for export to Japan. However, there is an opportunity for these two operations to co-exist harmoniously, as the bioenergy facility could take woodchips that are outside the maximum haulage distances to an export port, or do not meet export quality standards, which are becoming increasingly stringent.

Approximately 200,000m^3 of woodchips are currently exported from the lower northeast region to Japan through the port of Newcastle, with sufficient volumes of export quality chips to increase this volume to 500,000m^3. Another 30,000m^3 of woodchips are committed to the CSR hardboard mill at Raymond Terrace. Based on current allocations and committed volumes, the lower northeast region would provide cumulative excess in the order of 250,000 m^3. This volume includes chips from State forests' plantations, private property and sawmills, as well as residues left on the forest floor (beyond that required for retaining organic matter) and sawdust.

The critical issue for bioenergy production is the cost of transporting the raw supply to the facility. This option provides a narrow margin for adding profitability, particularly in Australia, where renewable energy suppliers must compete with relatively cheap energy generated from extensive fields of premium brown and black coal. Taking into account the woodchip volumes committed to Newcastle, there appears to be three potential locations for a bioenergy facility in northeast NSW, being the timber catchments encompassing Grafton, Kempsey and Walcha.

Kempsey and Walcha are located in the lower northeast RFA region. The potential for bioenergy production at Kempsey is similar to that described for Grafton in the upper northeast RFA region (Part 2), as it is also a large centre with relatively large processing facilities, and would draw on a similar coastal hardwoods resource.

The Walcha location is based on the currently untapped softwood resource in the Walcha-Nundle area. State Forests of NSW has not yet found an acceptable market for the 80,000m^3 of sawlogs and 80,000m^3 of pulpwood currently available from this estate. There would appear to be scope for an integrated sawmill/processing plant to utilise the sawlogs with an adjacent bioenergy facility to utilise the pulpwood and processor residues.

12.5.4 Costs

Based on experience in Australia and overseas, particularly in North America, the indicative capital cost associated with the above facility specification is $25 million (Enecon 1998). The facility would need to directly employ approximately 15 persons. The operating cost, excluding delivered wood costs, would be in the order of $1.1 million.

The cost of delivered wood is sensitive to the location of the facility and to other commitments existing on wood residues within the supply zone. Sawmill residues may be free to operations that will remove them from the mill, and the only cost is haulage to the production facility. Both sawmill residues and forest residues may also command a royalty or similar cost if there is another market for them, such as gardening applications or export woodchips. For consideration of this option at a strategic scale, this study assumes that wood supplies exist outside the range or over and above the supplies required to satisfy export woodchip contracts. With this assumption, apart from harvesting and haulage costs, there are no extra costs associated with wood supply. Forest owners and managers will derive an additional financial benefit from supplying bioenergy feed, as stands can be thinned or salvaged at no cost, stimulating growth in final crop trees.

TABLE 12E: INDICATIVE DELIVERED WOOD COSTS FOR BIOENERGY PRODUCTION IN NORTHEAST NSW

Location	Residue source	Volume (m^3)	Haulage (km)	Delivered cost (\$/m^3)
Kempsey	Euc sawmill	30,000	85	10
	Euc forest	70,000	150	35
Walcha	Euc forest	20,000	85	35
	Pine forest	80,000	85	35

* Unit prices based on average harvesting costs of \$20/m^3 and haulage at \$0.10/m^3/km.

Based on these indicative calculations, delivered wood costs for the specified facility would be in the order of \$3.5 million, and the total costs of operations, excluding capital investments, would be almost \$5 million per year.

12.5.5 Returns

An assessment of returns from bioenergy production options should consider both the 'grid price' and the 'consumer price'. The grid price is the price a bioenergy producer could sell electricity into the grid for dispersed consumption. This price in Australia is dictated by intense competition between the relatively large companies producing energy from brown and black coal, and may at times drop below the cost of production, which is currently in the order of 2-3 cents per kWh (TransGrid 1998a). It is unlikely that renewable energy could ever be produced for the same price (or less) as fossil fuel based energy. However, government incentives to encourage use of renewable energy, as discussed in Part 1, are providing marginal opportunities at least for producers to provide their services to environmentally conscious consumers. Various energy suppliers are now advertising 'Green Power' to customers, with premiums in the order of 2-4 cents per kWh, or between 10% and 30% more than coal based supplies (TransGrid 1998b). Significant resources of renewable energy, including biomass, wind and small hydro generation, are now being produced at costs in the range of 6 to 10 cents per kWh (Crawford-Smith, 1998). To meet the requirements of Federal and State Governments, energy retailers will look to purchase larger quantities of renewable energy at grid prices in the order of 6-8 cents per kWh.

The second set of returns is derived from differences between the cost of producing bioenergy on-site and purchasing electricity from the grid. While the grid price for renewable energy may be about 7-8 cents per kWh, industrial consumers purchase electricity at a price of 10-12 cents per kWh (Enecon 1998). If an industrial producer can supply their own energy, either electricity or cogenerated heat or steam, for onsite operations, they could potentially save 2-5 cents per kWh used. A medium sized sawmilling operation (25-30,000 m^3/year) may utilise 1,500kWh, and would reduce operating costs by up to \$50 per hour for each hour of operation.

12.5.6 Resource allocation scenarios

As for the softwood LVL production facility (see section 12.4.5), this option is based on an existing plantation resource, and different resource allocation scenarios would not directly impact its economic viability.

12.5.7 Research and development

The combustion of wood biomass for energy is common practice in Europe and the USA, with many examples available for reference (e.g., Puhakka, M. 1997; Anson et. al. 1993; DeBlaay 1994). CSIRO has recently developed “fluid bed carbonisation” technology for the controlled combustion of residues. This technology has performed successfully at the pilot plant phase, and is now ready for application in northeast NSW.

12.5.8 Other issues

In North America, bioenergy production facilities are most often built adjacent to or near one or more processing sites, with the primary objective of supplying these sites with all or most of their energy requirements from their own sawmill wastes. This has the significant benefits of a relatively secure wood resource with very low haulage costs, and an almost captive market for the bioenergy generated. The opportunity to gain these benefits in northeast NSW is somewhat limited by the relatively large distances between relatively small sawmills, though this opportunity should not be discarded during the structural reform process.

12.6 OPTION 5: CHARCOAL & ACTIVATED CARBON PRODUCTION

12.6.1 Opportunity

This opportunity has similar features to those discussed for Option 5 “Bionenergy Production”, and may be an appropriate module for an integrated facility incorporating a sawmill and bioenergy production. The Forestry and Forest Products Division of CSIRO has developed sophisticated technology for the production of charcoal and activated carbon from wood and wood processing residues. This technology has been tested at pilot plant scale, with results that suggest commercial scale plants in Australia would be economically viable.

This opportunity is particularly attractive in northeast NSW, as it would capitalise on the dense timber species growing in the region, and use sawmill residues and low grade logs to provide higher value products in demand by Australian and international markets. In addition, the production of charcoal and activated carbon can be built up flexibly and progressively in modular units to suit availability of feedstocks, capital and product requirements, thus minimising the risks associated with a new venture. Furthermore, this option is less dependent on large volumes of resources, being based primarily on the use of sophisticated technology to extract maximum value from the resource.

12.6.2 Commercial scale facilities

The exact configuration of the plant would be determined by the quantity and nature of its feed stock, the preferred product range, and the energy utilisation to occur in parallel with charcoal and activated carbon production. To enable a general review of costs and returns a typical plant is defined as follows:

- Resource supply: 22,000 tonne/year of wood residues, as woodchips or sawmill residues.
- Charcoal production: 2,750 tonne/year
- Activated carbon production: 1,500 tonne/year (using charcoal as feed)
- Energy production: up to 5 MW available as heat energy

(Enecon 1998).

12.6.3 Facility locations

Australia currently exports more than 60,000 tonne/year of charcoal for metallurgical and cooking use, largely produced from coal. The limiting factor in timber charcoal exports was found to be the lack of reliable supplies of consistent quality from the traditional charcoal burners.

Given that this option has a relatively high export potential, it would be desirable to site the operation close to an export port. In addition, this operation requires a steady flow of residual wood feed, a low grade product that does not afford long transport distances. Ideally, a charcoal and activated carbon production facility would be located close to a port and a consolidated grouping of forest operations or sawmillers. Based on this criteria, the Bulahdelah district would provide the most favourable site to begin a progressive industry. For the same reasons, woodchips from the Bulahdelah district are in strong demand for export through Newcastle. However, the volume of woodchips required for initial production of charcoal and activated carbon (~20,000m^3/year) is relatively small compared with existing export woodchip contracts (~200,000m^3/year), and the former option offers higher value adding potential for the local industry.

12.6.4 Costs

Indicative capital costs (Enecon 1998) associated with several plant options are summarised below:

Option		
1	Cost of plant producing 2,750 tonne/year of charcoal from 22,000 tonne/year wood	$2.5 million
2	Cost to double capacity of this plant to produce 5,500 tonne/year charcoal from 44,000 tonne/year wood	$1 million
3	Cost of adding an activated carbon plant to produce 1,500 tonne/year granular and pelletised carbon from 2,750 tonne/year charcoal	$3-4 million
4	Cost of adding a further 1,500 tonne/year activated carbon production	$1-2 million

To allow continuous supply of energy and maximum use of equipment, plant operation is normally considered on a 24 hour/day basis, requiring four or five shifts overall. This has a significant impact on operating costs for small plants and favours processing at least 25,000 tonne wood/year. Sharing personnel with an adjacent sawmill or other plant will help reduce labour costs. The basic facility would employ about 10 persons, and would have operating costs, excluding delivered wood costs, in the order of $1 million per year.

The cost of delivered wood is sensitive to the location of the facility and to other commitments existing on wood residues within the supply zone. The minimum cost for roundwood residues from forest operations will incorporate harvesting costs and haulage costs. Sawmill residues may be free to operations that will remove them from the mill, and the only cost is haulage to the production facility. Both sawmill residues and forest residues may also command a royalty or similar cost if there is another market for them, such as gardening applications or export woodchips. For consideration of this option at a strategic scale, and given the initial operation requires relatively small volumes of wood, it is expected that charcoal and activated carbon feed can be sourced from residue supplies over and above other demands. Therefore, apart from harvesting and haulage costs, there are no extra costs associated with wood supply. Forest owners and managers will derive a financial benefit from supplying wood resources to this option, as stands can be thinned or salvaged at no cost, stimulating growth in final crop trees.

Table 12f shows that delivered wood costs to Bulahdelah would be in the order of $750,000 per annum.

TABLE 12F: INDICATIVE DELIVERED WOOD COSTS FOR CHARCOAL AND ACTIVATED CARBON PRODUCTION

Location	Wood source	Volume (m^3)	Haulage (km)	Unit ($/$m^3$)
Bulahdelah	Euc sawmill	5,000	85	10
	Euc forest	20,000	150	35

Unit prices based on average harvesting costs of $20/m3 and haulage at $0.10/m3/km.

12.6.5 Returns

The sales revenue can be estimated based on current product prices:

TABLE 12G: INDICATIVE RETURNS FROM CHARCOAL AND ACTIVATED CARBON PRODUCTION

Product	Average Market Price	Annual Revenue
1,500 tonne of activated carbon for gold and water industries	$2000/tonne	$3,000,000
2,750 tonne charcoal (wholesale for export)	$500/tonne	$1,400,000
5MW Heat energy	$4/GJ (value for natural gas)	$600,000

Source: Enecon 1998

For the complete and upgraded facility, as per above specifications, producing all these products, annual revenue would be in the order of $5 million per year.

12.6.6 Resource allocation scenarios

In contrast with the woodchip export and bioenergy production options, this option requires relatively small volumes of residual wood, and different resource allocation scenarios would not dramatically affect its economic viability.

12.6.7 Research and development

The CSIRO technology for charcoal and activated carbon production is now at a stage where process optimisation for particular wood species can be carried out on a pilot plant, and this data used to confirm the design details of a commercial scale facility.

12.6.8 Constraints

The integrated production of charcoal and activated carbon from wood wastes, using sophisicated technology for process integration and maximum energy recovery, is relatively new to Australia, and has not yet been employed at an industrial scale. Although research work by CSIRO indicates that commercial success from industrial scale production is possible, a new production facility for northeast NSW would involve a ‘breaking ground’ project, requiring strong investor confidence.

13. CONCLUSIONS

The options outlined in this study illustrate that there is a range of viable industry development options for the forest industry in the lower northeast RFA region. If implemented these options would see the development of value adding nodes for the hardwood sawmilling industry. These nodes would allow smaller mills specialising in green sawntimber production to sell to other mills for further processing as well as facilitating the development of integrated value adding operations. The value adding mills would produce a range of outputs emphasising appearance and other high value products.

The large, consolidated softwood resource at Walcha-Nundle provides several other key options for the lower northeast region. Sawlogs from the extended estate could provide the basic resource for a long length softwood LVL production facility, with market opportunities in the large housing market between Sydney and Brisbane. The accompanying pulplogs from Walcha-Nundle could be directed into the production of bioenergy or charcoal and activated carbon products.

The establishment of bioenergy facilities offers the advantage of being adaptable to a range of mill sizes and can provide sources of electricity as well as heat for drying kilns. This technology is still developing and a current study by the Sustainable Energy Development Authority (SEDA) in NSW is examining particular sites where both large and small scale mills could be viable. There is an opportunity for a larger scale bioenergy facility to supply both heat and energy to either larger mills or to the value adding processing nodes.

An important feature of the Walcha-Nundle options is that they are protected from any variations in resource allocation scenarios.

With the existing export woodchip operation through the excellent port facilities at Newcastle, there is also the option of increasing the export of sawmill residues and pulpwood.

These development opportunities can be expanded if resource levels are increased. However, the nature of the volume increases would be very important to determining the impacts on industry development options eg, if the increase was to come from higher value stands of timber it is likely that this would allow an expansion of the sawmilling sector and possibly support the development of a large scale LVL mill. On the other hand, a large expansion in pulpwood could be absorbed within those options which have already been identified. For instance, the establishment of OSB and MDF mills would not appear to be viable regardless of the availability of increased volumes. Similarly, even at the 200% option it is not clear that a pulp mill would be viable. It is thus suggested that an expansion in resources available would not alter the type of options identified for the lower northeast region.

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