Plantation Forestry in Tasmania

The current resource, current processing and future opportunities

Graham Green

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Summary

Tasmania with 146,640 ha of hardwood and 76,100 ha of softwood plantation has 13% of Australia's plantations. The area of plantations represents about 14% of the total commercial forest in the State.

Tasmania's plantation estate is expanding rapidly at an average rate of 13,500 ha/year for the last 5 years, most of which is hardwood. Plantation expansion is largely occurring at the expense of native forest. Since 1999, the conversion rate of native forest to plantation has been 80% on private land and 65% on public land.

There are several drivers of the plantation expansion including: investment by off-shore manufacturers to produce pulpwood on short rotations under joint venture arrangements; domestic prospectus-based investment that provides tax deferral benefits; and the attractiveness of trading in carbon credits.

Private interests are becoming an increasingly dominant factor in controlling the product flow, marketing and end uses of Tasmania's plantation timber. Currently, 62% of plantation trees are privately owned and 27% as joint ventures. Although 40% of plantations are on public land just 11% of the trees are publically owned.

The biggest private plantation owner is Gunns Ltd with 80,000 ha of eucalypts, some of which have been established as joint ventures with its Japanese woodchip customers. The largest softwood holding in the State is currently 42,000 hectares jointly owned by Forestry Tasmania and American multinational GMO Renewable Resources Ltd.

In 2002-03 10,110 hectares of plantation was harvested in Tasmania from which over 2.5 million tonnes of plantation logs from public and private sources were produced. Most of these logs (around 70%) were woodchipped some of which were then exported and some used for the production of paper at Wesley Vale and some used for the production of fibre-based panels. Sawlog, almost exclusively pine, accounts for approximately 22% of the plantation log supply whereas export logs and roundwood account for 6%.

There are currently an estimated 1,115 plantation manufacturing jobs in Tasmania. The bulk of the jobs are in newsprint manufacturing (353), paper (290), sawmilling (310) and panels (110).

- There are 1.4x as many manufacturing jobs per m^3 of timber harvested from plantation forests than from native forests. This is poorer than in 1997 when plantations supported 3x more manufacturing jobs per m^3 than native forest wood.
- Woodchips and pulpwood now constitute 72% of plantation product whereas it was 60% in 1996.
- There is now an increased emphasis on short rotation plantation hardwoods for pulp production.
- Plantation production is becoming increasingly export commodity driven and increasingly controlled by joint ventures with overseas partners.
- In 2002-03 plantations produced 59% of Tasmania's sawn timber yet they represented just 22% of the area logged.

The report investigates ways in which the value of Tasmania's plantation estate may be maximised.

Increase intensive forest management (IFM). Under IFM, special thinning, pruning, fertilising and harvesting techniques are employed to maximise the scale, quality and economic value of plantation resources. This is the best way to maximise the output of quality timber aimed at high value markets.

Reduce export and process locally. Currently plantation raw materials fetch anything from \$5-30 m^3 in royalty and are worth \$65-84 m^3 once transported to a point of export. Manufacturing the plantation timber locally increases the export value of the plantation product by as much as 20x. Local processing of currently exported plantation based woodchips and whole logs would make available an estimated 750,000 tonnes of pulpwood (hardwood & softwood) and 130,000 m^3 of whole logs (softwood). Processing this resource locally could achieve the following:

- \$250 million of new investment
- 375 new jobs
- \$174 million in increased product value – increasing the value of Tasmania's current plantation products by 16% to 1.26 billion.

Aim for high value markets. Production of veneers followed by engineered and manufactured timber products such as MDF (medium density fibreboard), LVL (laminated veneer lumber) and ESL (elongated strand lumber) are the best options for optimising Tasmania's plantation timber resource in terms of employment, investment and resource consumption. Sawn timber ranks as the best option for optimising jobs in relation to investment.

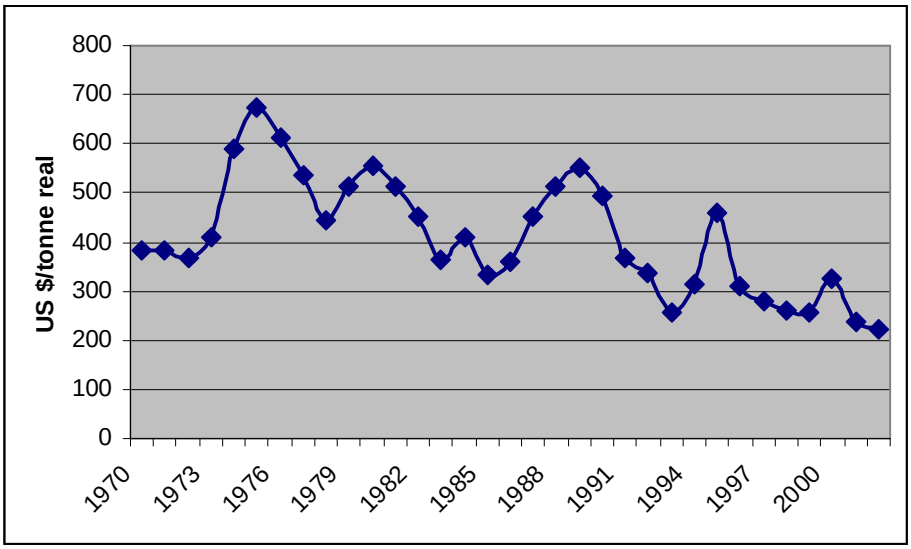
Is a pulp mill the answer? Construction of a pulp mill has the potential to significantly under-value the potential of the State's plantations and would be another example of a resource-hungry, low employment operation that would minimise Tasmania's options to adopt a range of innovative processing plants, for example, LVL will return 9x more jobs per tonne and veneer 22x more jobs per tonne of resource than a pulp mill.

There are significant question marks as to whether the plantation resource will be available to feed a new pulp mill even with an upbeat forecast of timber availability. Given no new plantation establishment, an estimated 6,640,000 (tonnes + m3) of plantation timber, primarily hardwood, will still be available annually from 2019, an increase of 170% on the current volume of 2,520,000 (tonnes + m3).

If the available timber was allocated to a new pulp mill it would consume most of the additional resource and create an estimated 300 new jobs for an investment of \$1.1 billion. Alternatively eight new enterprises, including new LVL, ESL, sawmilling and veneer plants could be established for a combined investment of \$770 million. The combined initiatives would require less resource than a pulp mill (2,000,000 tonnes) and create many more jobs (an estimated 1,320 new jobs).

The pulp mill option is made less attractive by the fact that the real world price for chemical wood-pulp is volatile and has been in decline in real terms since 1970.

Real price for world exports of chemical wood-pulp



Other important socio-economic & environmental factors that need to be weighed up in considering the future of plantation forestry in Tasmania are discussed and include:

- reduced stream flow and consumption of groundwater
- use of a suite of poisons – herbicides, pesticides, 1080 & fungicides
- soil compaction and erosion caused by harvesting operations
- soil nutrient decline and acidification
- visual impact following clearfelling.

Recommendations

Short term (1-5 years)

Reduce export of plantation woodchips and logs - process locally

Manufacturing plantation timber locally increases the export value of the plantation product by as much as 20x. Local processing of currently exported plantation based woodchips and whole logs would make available an estimated 750,000 tonnes of pulpwood (hardwood & softwood) and 130,000 m^3 of whole logs (softwood). Processing this resource locally could achieve the following:

- $250 million of new investment
- 375 new jobs
- $174 million in increased product value – increasing the value of Tasmania's current plantation products by 16% to 1.26 billion.

Increase intensive forest management

Under intensive forest management, special thinning, pruning, fertilising and harvesting techniques are employed to maximise the scale, quality and economic value of plantation resources. This is the best way to maximise the output of quality timber aimed at high value markets.

Reevaluate chemical use

In light of the ongoing controversy over the use of 1080 and recent controversy over aerial spraying there must be a move to:

- minimise the use of chemicals
- ban aerial spraying in accordance with calls made by the Australian Medical Association
- cease use of 1080, triazine chemicals and alpha-cypermethryn
- find alternatives to poisons
- establish more rigorous independent monitoring of chemicals
- cease chemical use in water catchments
- cease chemical use in proximity to organic farms - by defined buffer zones
- cease chemical use in catchments draining to areas used for aquaculture and fisheries.

Cease expansion of the plantation estate

There will be a tripling of current wood production from the existing plantation estate by 2019. The wood available will provide for a host of positive manufacturing options for Tasmania if used wisely with the best interests of the Tasmanian community and economy at heart. There is no need for extra wood beyond what is already coming on line, particularly as increasing the plantation estate comes at a significant social and environmental cost.

Due to conversion forestry, water yield, aesthetics, land productivity, chemical issues, and social issues further broad-scale plantation establishment should cease. Further

expansion should only occur if the plantations can be integrated into the landscape for mutually beneficial outcomes such as through farm forestry initiatives.

Greater transparency and access to information

Currently there is a proliferation of private forestry and joint venture forestry operations being conducted on public land. Tasmanians are getting less and less say into how their public forest land is managed and arguably less and less benefit as products and profits increasingly go to private interests and multinational companies.

There needs to be an enquiry into who is allowing the asset transfer to happen, who has made the decision, who is benefiting, and the long-term implications for the ownership of public assets that are essentially being privatised by stealth. Also, maps need to be made freely available showing: who owns what and which titles are earmarked for transfer to private interests.

Medium term (5-15 years)

Develop small, high value processing initiatives

Production of veneers followed by engineered and manufactured timber products such as MDF (medium density fibreboard), LVL (laminated veneer lumber) and ESL (elongated strand lumber) are the best options for optimising Tasmania's plantation timber resource in terms of employment, investment and resource consumption. Sawn timber is the best option for optimising jobs in relation to investment. Veneer will return 22x more jobs and LVL 9x more jobs per tonne of resource than a pulp mill.

Construction of a pulp mill has the potential to significantly under-value the potential of the State's plantations and would be another example of a resource-hungry, low employment operation that would minimise Tasmania's options to adopt a range of innovative processing plants. The argument for a pulp mill does not stack up in terms of investment, resource or employment grounds.

If the forecasted available plantation timber was allocated to a new pulp mill it would consume most of this resource for just 300 new jobs at an investment of $1.1 billion. Alternatively eight new enterprises, including new LVL, ESL, sawmilling and veneer plants could be established at less investment ($770 million), would use significantly less resource (2 million tonnes) and employ significantly more (an estimated 1,320 new jobs).

Implement restoration forestry

It is clear that there are problems with plantation forestry, for example:

- reduced stream flow and consumption of groundwater
- use of a suite of poisons – herbicides, pesticides, 1080 & fungicides
- soil compaction and erosion caused by harvesting operations
- soil nutrient decline and acidification
- visual impact following clearfelling.

Restoration forestry needs to be investigated as an option for the rejuvenation of degraded plantation land and has the potential to be a major industry in Tasmania in the future.

1.0 Introduction

It is a very important time for Tasmania's plantation industry. Tasmania's plantation processing industry has for several decades focused on the softwood radiata pine, which is currently used to produce sawn timber, pulp, newsprint, paper, panels and veneers. However, a significant amount of Tasmania's softwood plantation resource is currently exported as woodchips or as unprocessed whole logs. Part of the challenge for the future is to invest in innovative technologies that will enable the processing of this valuable resource locally in order to maximise the return to plantation investors and to maximise employment opportunities for Tasmanians.

Plantation hardwoods will potentially provide the cornerstone of the plantation sector into the future as there has been a great deal of recent investment in the establishment of hardwoods. The first fruits of the hardwood plantation resource are beginning to be borne with the export of woodchips and the milling of young plantation hardwood. Although there is relatively little plantation hardwood available at the moment, in ten years time it is estimated that Tasmania will have ten times the current extent of hardwood plantation and more than 5 million tonnes of plantation timber is expected to be available. With the huge investment in the establishment of hardwood plantations in Tasmania, the time is right to begin positioning for new products and new markets that will ultimately be available for such a significant forecast increase in wood availability.

A strong argument can be made for diversifying away from primarily pulpwood products which are resource hungry and do not deliver the employment benefits and export income benefits of more innovative products. It is time for Tasmania to capitalise on opportunities for value adding through solid wood production and engineered products such as laminated veneer lumber.

There has been no shortage of controversy over plantation establishment and management in Tasmania, particularly in relation to the conversion of native forests by clearfelling in order to establish the new plantations. The report investigates whether further plantation expansion is necessary and if so whether the expansion can be taken up on land that is not currently forested, such as unproductive agricultural land or as part of farm forestry initiatives.

Other current controversies over plantation establishment relate to the use of poisons for browsing control, to control weeds and to prevent insect attack. Additionally plantation timbers are becoming recognised for their significant impact on catchment water balance. This is an economic and social impact that needs to be weighed up against competing economic uses of water and also the ecosystem services that stream flow and groundwater provide.

This report provides an overview of Tasmania's plantation timber industry including the extent of the resource, who owns it, the rate of expansion, the current processors, current uses and the manufacturing employment generated. The report provides an analysis of the options Tasmania has for downstream processing the plantation resource now and into the future.

2.0 National context

As at December 2003 Australia had 1,665,693 ha of plantations of which 675,962 ha (41%) were hardwood (mainly eucalypts) and 988,223 ha were softwood species[1]. The plantation estate is steadily expanding with 82,000 ha/annum established in the five years to 2003. This expansion is in line with the target of the 'Plantations for Australia: The 2020 Vision' which contained a target of trebling Australia's plantations from 1997 to 2020.

Tasmania with 146,641 ha of hardwood and 76,104 ha of softwood plantation has 13% of Australia's plantations. However, Tasmania is now a national leader in the establishment of new plantations, particularly hardwood, and had the greatest new area established in 2003 (10,881 ha[2] - 26% of the national total).

2.1 2020 Plantation Vision

Plantations for Australia: The 2020 Vision is a strategic partnership between the Commonwealth, State and Territory Governments and the plantation timber growing and processing industry.

The overarching principle of the Plantations 2020 Vision strategy is to enhance regional wealth creation and international competitiveness through a sustainable increase in Australia's plantation resources, based on a notional target of trebling the area of commercial tree crops by 2020.

3.0 Overview of Tasmania's plantations

3.1 Plantations in context with other forests

As at 30 December 2003, Tasmania had 3.4 million hectares of forested land, including 76,000 hectares of softwood plantation and 146,000 hectares of hardwood plantation (total 222,000 hectares of plantations located on private and public lands)[3] (**Table 1**). The area of plantations represents about 14% of the total commercial forest in the State[4] (**Figure 1**).

[1] National Plantation Inventory 2004 update – Department of Agriculture, Fisheries and Forestry
[2] Ibid
[3] Forestry Tasmania Annual Report 2002/03 & National Plantation Inventory 2004 update
[4] DIER (2004). Rural land use trends in Tasmania. Davey & Maynard Agricultural Consultants.

Table 1: Summary of Tasmania's forested land

	State forest	Public reserves	Private land	Total area
Forest type				
Softwood plantation	54,000	1,000	21,000	76,000
Hardwood plantation	34,000		112,000	146,000
Total plantation	**88,000**	**1,000**	**133,000**	**222,000**
Tall native eucalypt forest(a)	493,000	6,000	150,000	878,000
Low native eucalypt forest(b)	337,000	14,000	685,000	1,548,000
Subtemperate (myrtle) rainforest(c)	176,000		22,000	567,000
Other native forest(d)	56,000	1,000	34,000	152,000
Total forest(e)	**1,149,000**	**22,000**	**1,010,000**	**3,353,000**

(Source: Forestry Tasmania, Annual Report 2002-03 & National Plantation Inventory 2004 update)

(a) Eucalypt forest with current or potential height of 34 m or more.
(b) Eucalypt forest with current or potential height of less than 34 m.
(c) With no significant eucalypt or acacia.
(d) Including acacia spp, melaleuca etc.
(e) Estimates have been rounded and minor discrepancies may occur between sums of component items and totals.

Figure 1: State forest production area 1998-2003

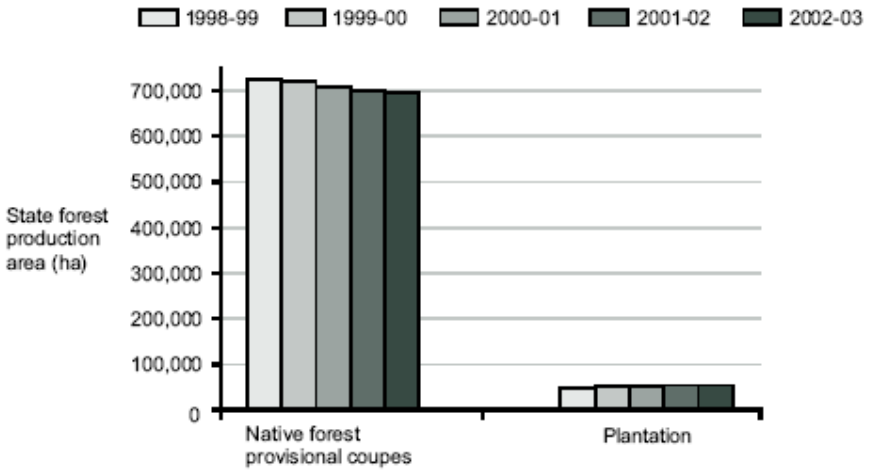


Figure source: Forestry Tasmania Sustainable Forest Management Report 2002-03

3.2 Plantation land ownership

On overview of plantation land ownership, as distinct from tree ownership (**Section 3.3**) is given in **Table 2**. Currently 60% of Tasmania's plantation land is privately owned, a trend that was continued with new establishments in 2003 (**Table 2**).

Table 2: Overview of plantation ownership in Tasmania as at December 2003

	Hardwood	Softwood	Total	%
Total plantations (hectares as at December 2003)				
Public	34,639	54,449	89,088	40%
Private	112,002	21,655	133,657	60%
Total	**146,641**	**76,104**	**222,745**	
Plantations established in 2003 (hectares)				
Public	3,681	1,146	4,827	44%
Private	5,804	250	6,054	56%
Total	**9,485**	**1,396**	**10,881**	

(Data source: National Plantation Inventory 2004 update)

3.3 Plantation tree ownership

An overview of plantation tree ownership in Tasmania is given in **Table 3**. More detail of tree ownership is given in **Figure 2**.

Table 3: Tasmania's plantations by tree ownership

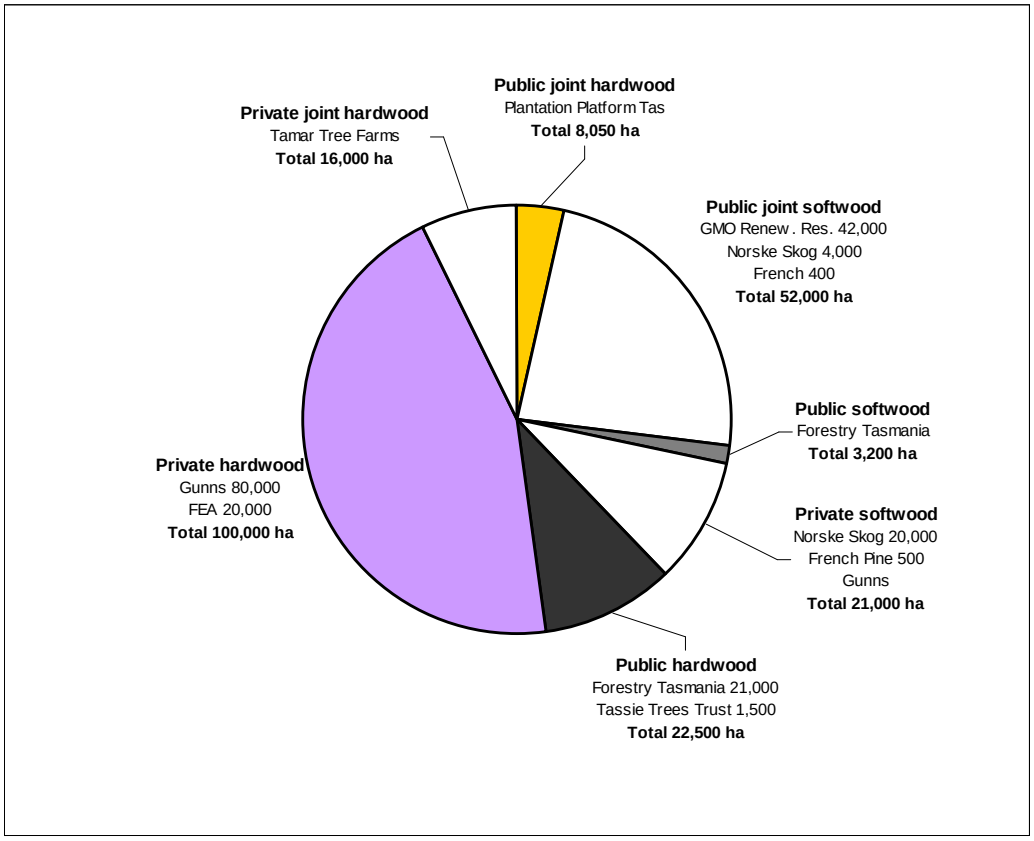
	Hardwood	Softwood	Total	%
Total plantations (Hectares as at Dec 2003)				
Public	22,511	3,192	25,703	11%
Private	116,082	21,004	137,086	62%
Joint*	8,048	51,908	59,956	27%
Total	**146,641**	**76,104**	**222,745**	
Plantations established in 2003 (Hectares)				
Public	1,075	5	1,080	10%
Private	8,193	250	8,443	78%
Joint(a)	217	1,141	1,358	12%
Total	**9,485**	**1,396**	**10,881**	

(Data source: National Plantation Inventory 2004 update)
(a) public and private parties have equity in the tree crop

Summary points from **Tables 2 & 3**:

- Although 40% of Tasmania's plantations are on public land only 11% of plantation trees are publically owned.
- In 2003 - 44% of new plantations were established on public land but only 10% of the trees were publically owned.
- Private interests are becoming an increasingly dominant factor in controlling the product flow, marketing and end uses of trees grown on State Forest.

Figure 2: Plantation tree ownership as at December 2003 (hectares)



Refer to **Section 3.4** (below) for detail of plantation ownership

NOTE: 76,100 ha (35%) of Tasmania's plantations are in joint venture arrangements under which most of the timber is earmarked for export, primarily for paper production.

3.4 The main plantation owners/managers

3.4.1 Gunns plantations and joint ventures

Gunns Ltd owns 175,000 ha of land in Tasmania more than half of this land is managed for the production of eucalypt plantations[5]. The company currently has joint venture arrangements with Forestry Tasmania and its major Japanese woodchip buyers, to establish an expanded eucalypt plantation resource. The development of plantations is funded through a combination of Gunns own funds, the prospectuses of Gunns Plantations Ltd and **joint ventures** with customers[6] for example:

- **Tamar Tree Farms** – a partnership with Mitsubishi Paper Mills and Tokyo Electric Power company[7]. The Tamar Tree Farms Joint Venture aims to establish 1,700 hectares of plantations per annum on a mixture of freehold, State forest and private property in the northeast of the state[8]. The objective of the venture is to supply woodchips from an estate of 25,500 hectares. Forecasts estimate 500,000 tonnes of wood to be available annually from 2012.
- **Plantation Platform of Tasmania** (PPT) – a partnership with Forestry Tasmania, Daio Paper, Kawasho International, Nakabayashi, Nissen, Nikkei BP, Kobunsha and NBS Ricoh[9]. PPT aims to create 7,500 ha of eucalypt plantations in northeast Tasmania over 15 years. The plantation timber will be used for woodchip production and processed in Japan by Daio Paper.

Gunns Ltd eucalypt plantations are managed solely for the production of pulpwood. Plantation wood currently comprises about 20% of their woodchip output, a figure that will rise when more plantations reach maturity[10].

3.4.2 Forestry Tasmania joint ventures

Forestry Tasmania owns some plantation land and timber in its own right but the majority of its holdings are in joint ventures. Forestry Tasmania's plantation joint ventures are summarised in **Figure 2** and **Table 4**. Under joint venture arrangements Forestry Tasmania provides the land, prepares the site, plants seedlings, provides ongoing plantations services and arranges harvest and sale of the trees for a range of customers and joint venture partners[11]. In all, 68% of Forestry Tasmania's plantations are in joint venture arrangements[12].

Most of the State's softwood plantation is jointly owned (50:50) by Forestry Tasmania and GMO Renewable Resources Ltd (a United States-based investment company) and managed by American multinational Rayonier Inc[13]. Rayonier is the

[5] www.privateforests.tas.gov.au
[6] www.gunns.com.au/Forest/plantations.html
[7] Ibid
[8] www.privateforests.tas.gov.au
[9] www.gunns.com.au/Forest/plantations.html
[10] Ibid
[11] www.privateforests.tas.gov.au
[12] Forestry Tasmania Annual Report 2002-03, p8.
[13] www.privateforests.tas.gov.au

manager of 42,000 ha of radiata pine located across the north of the State. Rayonier Tasmania is a subsidiary of Rayonier Inc., a United States-based forest products company, with land holdings in both the United States and New Zealand.

Rayonier specialises in the management and marketing of softwood timber and specialty pulp products, with sales to over 60 countries. Rayonier Tasmania's primary focus is on the management of the Softwood Joint Venture estate but has an interest in expanding that estate and the harvesting and marketing of radiata pine on private blocks[14].

Forestry Tasmania has also issued a number of Tassie Trees Trust prospectuses enabling people or organisations to become growers of commercial eucalypt plantations and has eucalypt joint ventures with Gunns Ltd and the Plantation Platform of Tasmania[15] (refer above) which aims to establish 500 ha of eucalypt plantations per annum on land owned by Forestry Tasmania[16]. Forestry Tasmania also has a softwood joint venture with Norske Skog Paper

Table 4: Forestry Tasmania's plantation ventures as at June 2003

	Softwood (ha)	Hardwood (ha)
Forestry Tasmania plantation on State forest and Crown Land	2,907	20,819
FT joint venture plantation on State forest and Crown land (a)	49,945	6,513
FT joint venture plantation on private land	598	253
Tassie Trees Trust plantation on State forest(b)	305	1,516
FT plantation on private land		278
Private plantation on State forest		3,709
Total	**53,755**	**33,088**

(Data source: Forestry Tasmania Annual Report 2002/2003)

(a) Most of these plantations are jointly owned by Forestry Tasmania and GMO Renewable Resources LLC and managed by Rayonier.

(b)Tassie Trees Trust plantations are mostly jointly owned with private growers

3.4.3 Norske Skog Paper

Norske Skog manages 24,500 ha of plantation (primarily *Pinus radiata)* in Tasmania, most of which is owned by the company, on freehold land or State forest[17]. The main focus of the company's plantation estate is to provide wood to meet the Boyer newsprint mill's needs.

[14] www.privateforests.tas.gov.au
[15] Forestry Tasmania Annual Report 2002-03, p18.
[16] www.privateforests.tas.gov.au
[17] Ibid

3.4.4 Forest Enterprises Australia

Forest Enterprises Australia (FEA) was incorporated in 1985 and began establishing its own eucalypt plantations in 1987, but expanded into the management of timber plantations on behalf of others in the late 1980s. FEA currently manages over 20,000 ha of plantation in Tasmania[18].

3.4.5 French Enterprises P/L

French Enterprises Pty Ltd owns and manages 473 ha of private radiata pine plantation and has joint venture interests totaling 362 ha[19]. Three of the joint ventures are with Forestry Tasmania and one with the Dorset Municipal Council.

3.5 What is the rate of plantation expansion?

In the past 50 years, a large plantation base has been established and is still rapidly expanding. The main species are the eucalypts Tasmanian Blue Gum (*Eucalyptus globulus*) and Shining Gum (*E. nitens*), Radiata pine (*Pinus radiata*) and some Blackwood (*Acacia melanoxylon*).

An increase in the area of plantations, particularly eucalypt plantations, has been a feature of recent years. While the majority of softwood plantations are grown on State forest (55 thousand hectares or 69.6% of all softwood plantations), the majority of hardwood plantations are grown on privately owned land (96 thousand hectares or 74.4% of all hardwood plantations)(**Table 3**).

The current rate of plantation expansion in Tasmania (based on last 5 years) is 13,500 ha per annum (**Table 5**).

Table 5: Total plantations established by calendar year (hectares)

	Softwood (ha)	Hardwood (ha)	Total
1999	2,374	16,467	18,841
2000	2,712	9,933	12,645
2001	2,643	12,310	14,953
2002	544	9,656	10,200
2003	1,396	9,485	10,881
Total	**9,669**	**57,851**	**67,520**

Data source: National Plantation Inventory 2004 update

[18] www.forestenterprise.com - the business

[19] Profiles of Northern Tasmania's core industry sectors. Northern Tasmanian Regional Development board (2002).

There was rapid expansion in eucalypt plantation establishment during 1996-2001 increasing in area by sixty percent or 44,000 hectares[20]. Plantation areas established on State forest since 1999 are given in **Table 5a**.

Table 5a: Plantations established on State forest

	Softwood (ha)	Hardwood (ha)	Total
1999/2000	3,900	4,200	8,100
2000/2001	2,700	4,300	7,000
2001/2002	3,500	4,500	8,000
2002/2003			7,350

Data source: Forestry Tasmania Sustainable Forest Management Report 2001-02 & Forest Practices Board Annual Report 2002-03.

Under the Forestry Growth Plan, revised targets for new Forestry Tasmania plantations are 4,500 ha/year of hardwood and 800 ha/year of softwood[21]. Growth of plantations on State forest is shown in Figure 3.

Figure 3: Area of plantation on State forest 1998-2003

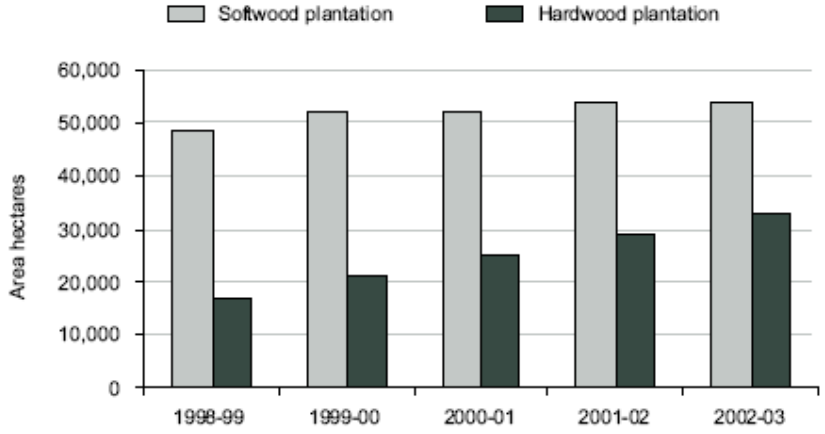


Figure source: Forestry Tasmania Sustainable Forest Management Report 2002-03

3.5.1 Plantation expansion drivers

There are several drivers of the plantation expansion including: investment by off-shore manufacturers to produce pulpwood on short rotations under joint venture arrangements; domestic prospectus-based investment that provide tax deferral benefits; development of the silvicultural knowledge to underpin short rotation production and to a lesser but emerging extent the attractiveness of trading in carbon credits.

[20] Forest Practices Board 2002, State of the Forest Report, State Government, Hobart.
[21] Forestry Tasmania sustainable forest management report 2002-03 p14.

3.6 Are native forests been converted to plantations?

A majority of the plantation expansion currently occurring in Tasmania is coming at the expense of conversion of native forest. Since 1999 80% of plantation expansion on private land and 65% of plantation expansion on public land has come at the expense of native forest (**Table 6**).

Table 6: Conversion of native forests to plantations

	Area clearfelled (ha)	Area converted to plantation or non-forest (ha)	% conversion
1999-00			
Public land	10,700	8,300	78%
Private land	9,600	7,500	78%
2000-01			
Public	10,210	6,990	69%
Private	7,890	6,460	82%
2001-02			
Public	8,070	5,320	66%
Private	4,960	3,960	80%
2002-03			
Public	8,150	3,330	41%
Private	6,450	5,090	79%
Totals 1999-2003			
Public	37,130	23,940	65%
Private	28,900	23,010	80%
Total all forest	**66,030**	**46,950**	**71%**

Data source: Forest Practices Board Annual Reports

3.7 Are plantations being established on prime agricultural land?

In 2002/03 2,870 hectares of new plantations were established on cleared land[22] (97% of this was on private land). This compares to 8,420 hectares of plantation that replaced native forest in the same period (**Table 6**). There has been ongoing controversy in Tasmania about the establishment of plantations of prime agricultural land and the impact this land conversion is having on the sustainability of rural communities, particularly in terms of employment opportunities, lifestyle, social infrastructure, landscape change, and catchment water quantity and quality. The following Table (**Table 7**) shows plantation land classification as at June 2003. The

[22] Forest Practices Board Annual Report 2002-03, p15.

information demonstrates that a minority of plantations have been established on prime agricultural land.

Table 7: Plantation land classification

	Hardwood (ha)	Softwood (ha)	Total (ha)
Class 1-3 (prime agricultural land)	5,000 (4%)	300 (<1%)	5,300 (2.3%)
Class 4 (little or no suitability for cropping)	20,000 (15%)	3,400 (4%)	23,400 (11.3%)
Class 5-7 (unsuitable for cropping & marginal suitability for grazing)	106,000 (81%)	72,000 (95%)	178,000 (86%)
Total	**131,000**	**76,000**	**207,000**

Data source: DIER (2004). Rural land use trends in Tasmania. Davey & Maynard Agricultural Consultants.

Plantations must be grown on sites capable of sustaining adequate growth rates. Consequently there will always be significant pressure to establish plantations on productive land if it is available.

3.8 Plantation age classes

3.8.1 Plantation area and age class

Plantation age classes are given in **Table 8**. The data shows how much plantation was established in five-year age classes and provides an indication of resource availability in the future. Although significant softwood plantation establishment has been occurring since the early 1970s, significant hardwood plantation expansion didn't begin until the late 1980s. Forecast plantation timber availability (based upon a continuation of the current rate of expansion) is discussed in **Section 6.1**.

Table 8: Area of Tasmanian plantations in five-year age classes, 2001

Age classes	Plantation area (ha)	
	softwood	**hardwood**
unknown	5,100	11,200
Pre-1960	300	200
1960-64	200	100
1965-69	3,000	0
1970-74	7,300	300
1975-79	11,300	1,200
1980-84	12,300	4,700
1985-89	10,600	15,700
1990-94	11,200	28,500
1995-99	15,200	36,900
2000-04(a)	3,900	18,800
Total	**80,400**	**117,600**
Latest figure(b)	**76,104**	**146,641**

Data source: Forest Practices Board 2002, *State of the Forest Report*, State Government, Hobart & RPDC (2002) review of the Regional Forest Agreement, p45.
(a) Only two years of planting data were available for this period.
(b) National Plantation Inventory 2004 update.

3.9 Where are the plantations?

Tasmania's plantation estate is depicted in **Figure 4**. Plantation extent by bioregion and catchment is given in the subsequent two sections.

Figure 4: Plantation map of Tasmania

3.9.1 Plantations by catchment

The largest percentage areas of plantation development by catchment occur in the Cam and Emu catchments in the north of the State, which contain 7,770 ha of softwood and hardwood plantations (26.9% of the area of the catchment) and 7,523 ha (29.5% of the area of the catchment), respectively[23]. The Arthur River catchment contains 16,632 ha of plantation, the largest total area of plantation within a catchment[24] (**Appendix 1**).

3.9.2 Plantations on karst

Plantation development presently occurs in only isolated areas containing karst in Tasmania, but is most prevalent in Permian limestones. This karst type has a total area of 21,640 ha with plantation development occurring on 1,017 ha (4.7%)[25]. Plantation development is a potential issue for management of karst in some parts of Tasmania. Karst systems rely on the maintenance of hydrologic and geomorphic processes, which depend on water availability and water quality[26].

3.10 Specialty plantations

Tasmania's specialty timber trees such as myrtle, celery-top pine and sassafras are not ideally suited to growing in plantations due to slow growth rates and susceptibility to dessication and browsing pressure. Plantations of blackwood have however been established in the State. In relation to other specialty timbers, blackwood is fast growing and in 1997 there were 780 hectares of blackwood plantation.

Pure plantings of blackwood have shown poor form in Tasmania with multiple branching and seedling loss due to frost and browsing[27]. Plantation grown blackwood requires pruning to correct form and produce quality sawlogs and the use of 1080 poison is used to control browsing[28]. The rotation objective for blackwood sawlogs is 40 years. The economics of plantation grown blackwood have been described as 'satisfactory' but not as good as the return on growing radiata pine[29].

[23] Private Forests Tasmania 2002, Forest Group Data v.2, Private Forests Tasmania, Burnie, www.privateforests.tas.gov.au
[24] Ibid
[25] Private Forests Tasmania 2002, Forest Group Data v.2, Private Forests Tasmania, Burnie, www.privateforests.tas.gov.au
Ibid
[27] Neilsen & Brown (1997). Growth and silviculture of *Acacia melanoxylon* plantations in Tasmania. Tasforests 9 p51
[28] Ibid
[29] Ibid

4.0 Plantation production and products

4.1 How much plantation is harvested each year?

In 2003-03 10,110 hectares of plantation was harvested in Tasmania (**Table 9**) from which over 2.5 million tonnes of plantation logs from public and private sources were produced (**Table 10**).

Table 9: Plantation harvesting in Tasmania 2002-03

	Thinning	Clearfelling followed by plantation	Clearfelling followed by non-forest use	Total
State forest	1,990	4,120	20	6,130
Private land	1,050	3,620	110	4,780
Total	**2,240**	**7,740**	**130**	**10,110**

Data source – Forest Practices Board Annual Report 2003-03

4.2 Plantation timber - log production

4.2.1 Overview

Currently an estimated 2,500,000 tonnes of plantation logs are produced in Tasmania annually (**Table 10**). Most of these logs (around 70%) are woodchipped some of which are then exported and some used for the production of paper at Wesley Vale and some used for the production of fibre-based panels, e.g. the Carter Holt Harvey MDF plant at Bell Bay. Sawlog, almost exclusively pine, accounts for approximately 22% of the plantation log supply whereas export logs and roundwood account for 6%.

Table 10: Recent production of plantation timber logs in Tasmania (m3)

	1999-00	2000-01	2001-02	2002-03
Softwood plantations (public)				
Sawlog (m3)	194,400	173,200	225,200	229,600
Roundwood (m3)	6,700	19,600	6,300	5,300
Export logs (m3)	71,800	81,000	124,300	64,600
Pulpwood (tonnes)	184,500	213,400	213,200	303,000
Total	**457,400**	**487,200**	**569,000**	**602,500**
Softwood plantations (public + full production figures for Taswood Growers joint ventures)				
Sawlog & veneer (m3)	384,000	341,000	427,000	447,000
Roundwood (m3)	14,000	40,000	12,000	10,000
Export logs (m3)	135,000	163,000	245,000	129,000
Pulpwood (tonnes)	278,000	306,000	292,000	418,000
Total	**811,000**	**850,000**	**976,000**	**1,004,000**
Softwood plantations (private)				
Sawlogs & veneer (m3)	102,000	97,000	100,000*	100,000*
Pulpwood (tonnes)	297,000	286,000	300,000*	300,000*
Total	**399,000**	**383,000**	**400,000***	**400,000***
Total softwood	**1,210,000**	**1,233,000**	**1,376,000**	**1,404,000**
Eucalypt plantation (public)				
Pulpwood (tonnes)	7,000	25,000	36,000	120,000
Eucalypt plantation (Private)				
Pulpwood (tonnes)	210,000	238,000	1,000,000**	1,000,000**

Data sources: Forestry Tasmania Sustainable Forest Management Report 2002-03, p57; Forestry Tasmania, Annual Reports 1999-03; Tasmanian & Commonwealth Govts (2002) Sustainability indicators for Tasmanian forests prepared for the review of the Tasmanian RFA.
***Best estimate due to unavailability of data**
****Forecast volume: Banks & Clark[30]**

4.2.2 Softwood timber logs

The main softwood product groups are:

- pruned logs, marketed as veneer logs and clearwood sawlogs
- unpruned logs, marketed as standard sawlogs, optional sawlog and small sawlogs
- pulpwood
- roundwood.

Pruned Softwood Logs

The high site quality of plantation areas are managed under a clearwood regime requiring pruning of the final crop trees to 6.4 metres high. These pruned logs are the premium plantation product. The very best radiata pine logs meet strict specifications

[30] Banks, A & Clark, J (1997). Tasmania's plantation processing industry – job opportunities now and in the future.

for diameter, straightness and centralised pith are sold for slicing and peeling into decorative veneer[31] (8,300 cubic metres in 1997) with the rest actively sought after by the sawmilling industry (48,000 cubic metres in 1997)[32] (refer also to **Section 7.1.1**).

Currently around 26% of the public softwood plantation estate is managed under a clearwood regime with thinning and high pruning for veneer log production and projections indicate that the veneer supply from softwood plantations will reach an annual yield of 50,000 m^3 by 2010[33].

Unpruned Softwood Logs
Unpruned softwood logs: these are also from either the clearwood regime or the knot control regime and are segregated according to grading rules related to diameter, length, knot frequency and size, and straightness[34].

Softwood Pulpwood
Softwood pulpwood is generally those sections of the stem not suited to solid wood production and meeting diameter and length criteria[35].

Softwood Roundwood
Softwood roundwood: radiata pine treated with a preservative has an extended life in exposed and in-ground situations. Roundwood products include fence posts, strainers, stays, shed poles and lightweight construction poles.

4.2.3 Hardwood timber logs

Tasmania's hardwood (*Eucalyptus globulus* and *E. nitens*) plantation resource is currently managed on short rotations (15-20 years) primarily for pulpwood production. Eucalypt plantation hardwoods are a preferred source for woodchips for the production of high quality paper. The high fibre yield and lightness of colour ensures its superiority to native forest timber[36]. It is a premium product that requires less bleaching than and chemical inputs in its manufacture[37].

It is assumed that 15% of hardwood planted on State forest will be high pruned to produce sawlogs (category 3)[38] and timber suitable for rotary peeling. Plantation hardwood sawn timber is currently being produced at Forest Enterprises Australia mill at Bell Bay (**Section 4.3.1**). It is estimated that 1,000,000 tonnes of plantation hardwood will be available annually from 2019 (**Section 6.1**). There is also potential to produce sliced veneers from the highest quality plantation hardwoods and about 10,000 m^3 would be required to replace the current supply from native forests[39]. Private plantation owners are not obliged to produce high quality sawlog and much

[31] www.forestrytas.com.au/forestrytas/pages/products.html
[32] Ibid
[33] Banks & Clark (1997). Tasmania's plantation processing industry – job opportunities now and in the future.
[34] www.forestrytas.com.au/forestrytas/pages/products.html
[35] Ibid
[36] www.forestenterprise.com - timber and woodchip sales
[37] Ibid
[38] Forestry Tasmania (2002). Review of sustainable high quality eucalypt sawlog supply from Tasmanian State Forest.
[39] Banks & Clark (1997). Tasmania's plantation processing industry – job opportunities now and in the future.

early planting has been specifically focused on the production of short rotation pulpwood[40].

4.3 Plantation forest companies & their products

4.3.1 Forest Enterprises Australia

Forest Enterprises Australia (FEA) was incorporated in 1985 and began establishing its own eucalypt plantations in 1987, but expanded into the management of timber plantations on behalf of others in the late 1980s[41]. In June 2000 the company was listed as a public company on the Australian Stock Exchange, however it remains majority Tasmanian owned and is based in Launceston.

FEA currently manages over 20,000 hectares of plantation in Tasmania[42]. Most of its plantation resource is located across the north of Tasmania, but also has significant holdings in the south. The company employs about 50 people plus many additional contractors in seedling nurseries, site preparation, planting, tending and harvesting. The company has been harvesting some of its earliest eucalypt plantations since 1997[43].

Sawn timber - The capacity of the FEA sawmill at Bell Bay is 150,000 m3/annum. The mill employs HewSaw technology which is a small diameter log cutter from Finland enabling small diameter logs to be cut[44]. The technology helps to relieve internal stresses and gives high recovery for small diameter logs. FEA recently won an award for applying softwood saw technology to plantation grown *Eucalyptus nitens* to recover sawn timber from trees that are conventionally grown for paper fibre production. Timber as young as eight years can be milled using the technology[45].

Woodchips – FEA's residue chipping facility has an annual capacity of 100,000 tonnes some of which goes to supply the nearby Carter Holt Harvey MDF plant.

4.3.2 Gunns Limited

Gunns Ltd was established in 1875 and is now Australia's largest hardwood forest products company and the country's largest hardwood sawmiller. It employs over 1,000 people in Australia and New Zealand and has a turnover in excess of $240 million[46]. Its operations include four hardwood sawmills throughout Tasmania. These produce 500,000 m^3 of sawn timber per year. It has three veneer mills producing decorative sliced veneer, one in the north of Tasmania, one in the south, together processing 20,000 m^3 per year and the third at Christchurch, in New Zealand.

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[40] Forestry Tasmania (2002). Review of sustainable high quality eucalypt sawlog supply from Tasmanian State Forest.
[41] www.privateforests.tas.gov.au
[42] www.forestenterprise.com - the business
[43] www.privateforests.tas.gov.au
[44] Branchline October 2003 p6. Forestry Tasmania magazine.
[45] Ibid
[46] Profiles of Northern Tasmania's core industry sectors. Northern Tasmanian Regional Development board (2002).

Woodchip production and export is Gunn's major business activity and it operates four woodchip export ports in Tasmania. Woodchip exports were predicted to account for 65% of the company revenue in 2002[47].

The company also produces seasoned framing timber, rough sawn kiln-dried hardwood for further manufacture into hardwood products, such as laminated beams, tongue and groove flooring, overlay flooring, mosaic and block parquetry, mouldings and furniture components.

The company owns its own seed orchards that supply all of the company's seed requirements. This seed is used to grow genetically improved seedlings of both *Eucalyptus globulus* (blue gum) and *Eucalyptus nitens* (shining gum). The company's seedling nursery is capable of growing 13 million seedlings per annum[48].

The company owns 175,000 hectares of land in Tasmania and manages more than 80,000 ha of plantations of mainly eucalypts. Its plan is to liquidate its remaining softwood plantation resource over the next few years and convert this area to medium rotation eucalypt plantation to produce hardwood pulp[49].

Gunns have wholesale timber outlets in most Australian capital cities, six "Mitre-10" hardware stores throughout Tasmania, four woodchip export facilities, a Tasmanian based construction company and a plantation investment company (Gunns Plantations Ltd).

4.3.3 Norske Skog Paper

Norske Skog operates in 15 countries worldwide. Its Australasian division comprises three mills (Boyer in Tasmania, Albury in Southern NSW and Tasman in New Zealand). At the Boyer Paper Mill, near New Norfolk, the principal focus is making newsprint. The company manages 24,500 ha of mostly *Pinus radiata* plantation in Tasmania, most of which is owned by the company, on freehold land or State forest. The plantation establishment program has been reduced in the past few years and currently no joint ventures with private landowners are being established. The main focus of the company is to provide wood to meet Boyer's needs, however other products, such as sawlogs, export woodchips and veneer are produced from the plantation and native forest estate managed by Norske Skog.

At Boyer, the company directly employs 470 people. The Company's total economic contribution to the Tasmanian community from wages and local expenditure on goods is approximately $110 million per year. Most of Boyer's 280,000 tonnes of newsprint production is distributed to mainland Australia, where it is used by the major publishing houses. This represents about 40% of the newsprint and related grades used in Australia each year.

[47] Profiles of Northern Tasmania's core industry sectors. Northern Tasmanian Regional Development board (2002).
[48] www.privateforests.tas.gov.au
[49] Ibid

Norske Skog Boyer utilises two broad types of wood fibre, 75% pine and 15% eucalypt[50]. Recycled newsprint fibre and imported Kraft fibre (imported from New Zealand) is also used at Norske Skog Boyer averaging about 10% of the product content[51]. Pine logs are sourced from a variety of plantations throughout Tasmania with some 50% coming from the company's own plantations in southern Tasmania. Pine chip residues are also purchased from pine sawmills in northern Tasmania[52]. Eucalypt logs are sourced from regrowth and regenerated forests in southern Tasmania, largely from State forest of average age 50 years. No oldgrowth trees are utilised at the mill[53].

4.3.4 Paperlinx - Wesley Vale & Burnie

The Paperlinx Wesley Vale and Burnie mills on Tasmania's northwest coast together employ over 500 people and have ongoing relationships with 140 local contractors[54].

The Burnie Mill no longer produces any hazardous by-products and both mills have eliminated dioxin emissions. Chlorine has been completely eliminated from the Wesley Vale Mill's bleaching processes and now uses hydrogen peroxide[55].

Wesley Vale Mill

The Wesley Vale Mill is equipped with two pulp mills, a paper machine and an off-machine coater. The mill can produce 40,000 tonnes of pulp and 135,000 tonnes of coated and uncoated papers for publishing, business forms and printing[56]. Fibre sources at Wesley Vale include plantation pine and plantation eucalypt.

Burnie Mill

The Burnie Mill has two paper machines and can produce 128,000 tonnes of paper every year[57]. Most of the paper is for forms-grade photocopying, offset printing and base grades of paper which are then coated at the Wesley Vale Mill[58]. The main fibre source for the Burnie Mill is imported pulp.

4.3.5 Auspine

Auspine Limited is Australia's largest non-government producer of Radiata Pine[59]. The Scottsdale is a sawmill, preservative treatment plant and a woodchipping operation. Auspine Tree Farms in Northern Tasmania harvests plantation radiata pine under access agreements.

Multimillion dollar expenditure on state-of-the-art technology for large and small diameter logs has upgraded log-sorting, and increased sawing accuracy, optimised

[50] Norske Skog Boyer, Environmental Management Plan 2001, p32.
[51] Norske Skog Boyer, Environmental Management Plan 2001, p35.
[52] Norske Skog Boyer, Environmental Management Plan 2001, p32.
[53] Ibid
[54] www.reflex.com.au/about_make_wesburne.aspx
[55] Ibid
[56] Ibid
[57] Ibid
[58] Ibid
[59] Profiles of Northern Tasmania's core industry sectors. Northern Tasmanian Regional Development board (2002).

sawlog utilisation, further improved quality control, kiln systems, and preservation treatment, while reducing production costs. Auspine at Scottsdale employs 152 permanent staff, and around 20 casual employees[60].
Volume of production – 68,000 m^3/yr

4.3.6 French Enterprises Pty Ltd

French Enterprises is a private family owned company primarily involved in the milling of Tasmanian grown radiata pine. The company employs around 135 people at its Scottsdale sawmill, producing high-grade softwood timber products, including treated pine for Tasmanian and interstate markets. Supplementary to the milling operation, French Enterprises Pty Ltd has steadily increased it plantation interests. Today the company owns and manages 473 hectares of private radiata pine plantations and has joint venture interests totaling 362 hectares. All plantations are managed with a view to producing the highest quality veneer and pruned radiata pine sawlogs. Volume of production – 49,000 m^3/yr.

4.3.7 Carter Holt Harvey

Carter Holt Harvey – CHH - (formerly Starwood) is at Bell Bay on the Tamar River. The plant was commissioned in 1998 and was purchased by CHH in December 2002.

CHH is Australia's largest medium density fibreboard (MDF) plant. Medium density fibreboard is a high quality engineered timber product offering superior qualities of consistency of finish and density, freedom from knots and natural irregularities, as well as having the characteristics of strength, durability and uniformity not always found in natural timber. It has excellent machine-ability due to its homogenous consistency. These characteristics make MDF particularly suited for use in flooring, panelling, manufacture of furniture, cabinets, and mouldings, as well as structural applications. CHH is unique for it is the only MDF plant in Australia which produces both a 100% pine and a eucalyptus/pine blended MDF[61]. The plant is able to produce up to 120,000 tonnes of MDF per annum[62] and employs 105 people.

CHH is situated within close proximity to the Port of Launceston at Bell Bay and exports product to Southeast Asia, New Zealand, Melbourne and Sydney. CHH has also invested in pine plantations in the region, which are managed by Forestry Tasmania.

4.3.8 Tasmanian Wood Panels P/L

Tasmanian Wood Panels P/L is a particle board manufacturer located at Wesley Vale in the State's north. Volume of production is approximately 42,000 m^3/yr.

[60] Profiles of Northern Tasmania's core industry sectors. Northern Tasmanian Regional Development board (2002).
[61] Ibid
[62] Ibid

4.3.9 Tasmanian Fibre P/L

Tasmanian Fibre P/L is a joint venture between Forest Enterprises Australia (FEA) and Neville Smith Timber Industries (NSTI). The joint venture aims to provide wood fibre to both domestic and export markets with raw material sourced from a combination of sawmill residue and FEA's eucalypt plantations. The project will have an initial capacity to export 300,000 tonnes of woodchips per annum and employ 10 people[63].

4.4 Summary of plantation forest products

An overview of the product flow from Tasmania's plantations is given in **Table 11**. Products manufactured from the plantation resource in 2003 are summarised in **Table 12**.

Table 11: Summary of plantation products in 2002-03

	Volume	**%**
Logs		
Hardwood woodchips (tonnes)(a)	1,120,000	44%
Softwood pulpwood (tonnes)	718,000	28%
Sawlog (m3)	547,000	22%
Export logs (m3)	129,000	5%
Roundwood	10,000	<1%
	2,520,000	
Products		
Newsprint (tonnes)(b)	310,000	30%
Paper (tonnes)(c)	302,000	29%
Sawn timber & veneer (m^3)	232,000	22%
MDF (tonnes)	120,000	11%
Particle board (m^3)	42,000	4%
Treated pine (m^3)	40,000	4%
	1,046,000	

(a) Latest data not available - based largely on the volume forecast by Banks & Clark (1997)
(b) Produced with input from native forest regrowth (~20%) and imported pulp (~10%)
(c) 42% is manufactured from imported pulp at Paperlinx Burnie

Currently an estimated 41% of Tasmania's plantation grown timber is exported as whole logs and woodchips. An estimated 40% of softwood pulpwood is exported and an estimated 70% of plantation hardwood is exported as woodchips. This is where Tasmania has a huge opportunity. Downstream processing more of this timber locally has the potential to significantly increase wealth in Tasmania (see **Section 7.1.3**). For example, export pulpwood used locally for expansion in panel and paper production and whole logs for establishment of rotary peeled veneers for plywood and LVL (laminated veneer lumber).

[63] www.forestenterprise.com – FEA enters into joint venture

Table 12: Breakdown of forest products processed from primarily plantation feedstock

			Particle board (m3)	Sawn timber & veneer (m3)	MDF (tonnes)	Newsprint(a) (tonnes)	Paper(b) (tonnes)	Treated pine (m3)
PAPERLINX	woodchip mill and a pulp and paper mill	WESLEY VALE					174,000	
PAPERLINX	pulp and paper mill	BURNIE					128,000	
NORSKE SKOG PAPER MILLS (AUSTRALIA) LIMITED	pulp and paper manufacture	BOYER				310,000		
CARTER HOLT HARVEY	medium density fibreboard	BELL BAY			120,000			
TASMANIAN WOOD PANELS (AUST) PTY LTD	Particle board	WESLEY VALE	42,000					
AUSPINE LIMITED	sawmill	TONGANAH		68,000				
FRENCH ENTERPRISES PTY LTD	sawmill	SCOTTSDALE		49,000				
FOREST ENTERPRISES AUSTRALIA TIMBER P/L	wood processing works	BELL BAY		100,000				
AUSPINE LIMITED	timber preservation plant	TONGANAH						7,000
KOPPERS TIMBER PTY LTD	timber preservation plant	LONGFORD						32,500
OTHER (eg TTC/Gunns)	sawn timber			15,000				
TOTAL			**42,000**	**232,000**	**120,000**	**310,000**	**302,000**	**39,500**

(a) Produced with input from native forest regrowth (~20%) and imported pulp (~10%)
(b) 42% is manufactured from imported pulp at Paperlinx Burnie

5.0 Current plantation forest employment

5.1 Manufacturing sector

Tasmania's plantations are a significant generator of manufacturing employment, particularly in the production of paper products, sawn timber and panels (**Table 13**). The performance of plantation timbers, in terms of processing and employment, is compared to the native forest industry in **Table 14.**

Table 13: Major plantation based manufacturing employers in Tasmania

Company	**Total manufacturing jobs**	**Plantation manufacturing jobs**
Norske Skog Paper(a)	470	353
Paperlinx Wesley Vale	290	290
Paperlinx Burnie(b)	232	0
Auspine	172	172
French Pine	135	135
Carter Holt Harvey	105	105
Forest Enterprises Australia	50	50
Tasmanian Fibre P/L	10	10
Total	**1,464**	**1,115**

Data source: Direst inquiry and web site information
(a) Feedstock is approximately 75% softwood plantation
(b) Feedstock is imported pulp

Table 14: Employment - plantations versus native forests

	Manufacturing jobs(a)	**Timber harvested** (m3)	**Area logged 2002-03(b)**	**Sawn timber produced(c) (m3)**
Plantations	**1,115**	**2,520,000**	**10,110 ha**	**232,000**
Manufacturing jobs/timber harvested = 0.44				
Sawn timber/volume harvested = 0.09				
Native forests	**1,936**	**6,000,000**	**35,320 ha**	**163,300**
Manufacturing jobs/timber harvested = 0.32				
Sawn timber/volume harvested = 0.03				
Total	**3,052**	**8,520,000**	**45,430 ha**	**395,300**

(a) ABS total timber industry manufacturing jobs (Nov 2003) were 3,400

(b) Forest Practices Board Annual Report 2002-03
(c) ABARE – Australian forest and wood product statistics 2003-04

- There are currently 1.4x the manufacturing jobs per m^3 of timber harvested from plantation forests than from native forests. This is poorer than in 1997 when plantations supported 3x more manufacturing jobs than native forests[64].
- Woodchips and pulpwood now constitute 72% of plantation product whereas it was 60% in 1996[65].
- Plantations account for 29% of timber harvested in Tasmania yet generate 37% of the manufacturing jobs.
- In 2002-03 plantations produced 59% of Tasmania's sawn timber yet they represented just 22% of the area logged.
- Plantations currently produce three times more sawn timber per m^3 harvested than native forest.

5.2 Total employment

Total plantation related employment in Tasmania is estimated at 2,012[66] which includes, harvesting, loading, transport, processing and administration.

6.0 Future plantation resource availability

6.1 Plantation resource forecast

Tasmania's plantation timber resource is predicted to expand rapidly, particularly the hardwood resource. In ten years it is expected that there will be 10x more plantation hardwood available and 17x more than current in 20 years (**Table 15; Figure 5**).

The resource availability predictions are based upon the plantation establishment rate continuing at the current rate which is 9,400 ha/yr for hardwood and 1,950 ha/yr for softwood. This is an important and contentious issue as plantation expansion is currently occurring largely due to clearfelling and conversion of native forest (**Section 3.6**). For further plantation expansion and resource availability to be ecologically, ethically and economically sustainable then the predicted expansion must be based upon the use of unproductive agricultural land or as farm forestry ventures (**Section 7.3.1**).

[64] Banks & Clark (1997). Tasmania's plantation processing industry – job opportunities now and in the future.
[65] Ibid
[66] Extrapolation from: Burns, K., D. Walker & A. Hansard 1999. Forest plantations on cleared agricultural land in Australia. Australian Bureau of Agricultural and Resource Economics, Canberra. Research Report 99.11

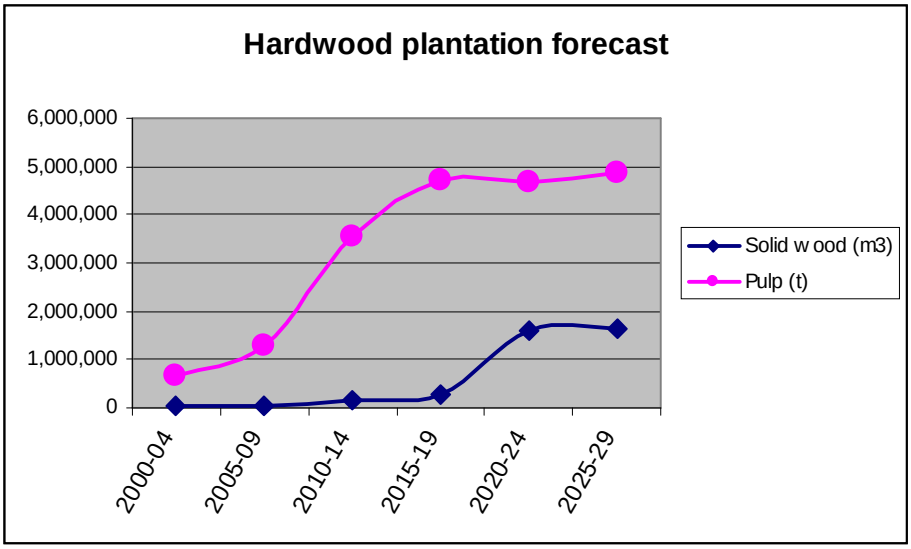
Table 15: Forecast of Tasmanian plantation timber availability

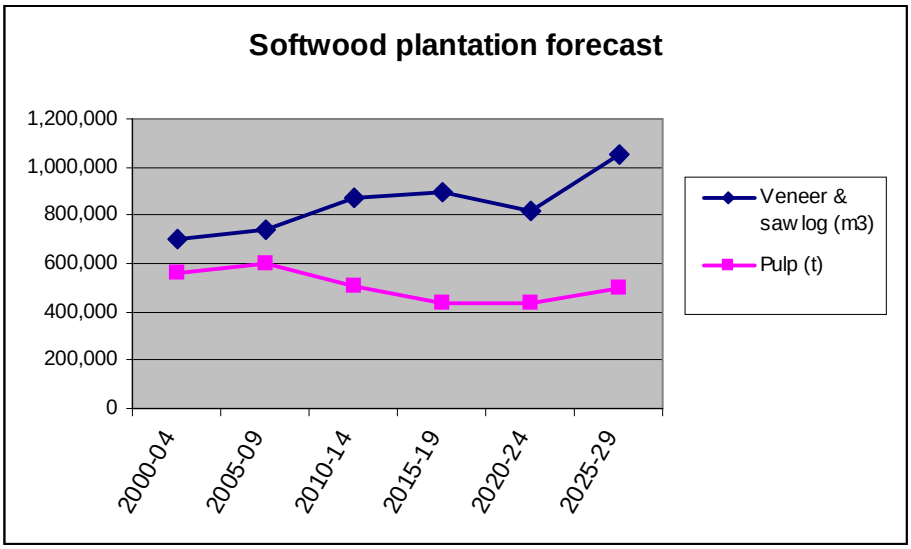
(Data presented in m^3 as average annual volume over five year periods)

		2000-04	2005-09	2010-14	2015-19	2020-24	2025-29
Hardwood	Solid wood(a)	20,000	20,000	140,000	270,000	1,600,000	1,620,000
	Pulp	680,000	1,290,000	3,530,000	4,720,000	4,660,000	4,860,000
	Total	**700,000**	**1,310,000**	**3,670,000**	**4,990,000**	**6,260,000**	**6,480,000**
Softwood	Veneer & sawlog	700,000	740,000	870,000	900,000	820,000	1,050,000
	Pulp	56,0000	600,000	510,000	440,000	440,000	500,000
	Total	**1,260,000**	**1,340,000**	**1,380,000**	**1,340,000**	**1,260,000**	**1,550,000**

Data source: Tasmanian & Commonwealth Governments (2002) RPDC report RFA update p46
(a) Available for a variety of uses such as rotary peeling, sawn timber, laminated veneers

Figure 5: Plantation hardwood and softwood timber forecast





Despite significant growth in the plantation hardwood resource, hardwood solid wood production from plantations will not make a significant contribution to available sawlog volume before about 2017 onwards (**Figure 5**).

7.0 Maximising the return from plantations

More than 5 million tonnes of plantation timber is expected to be available in Tasmania within ten years (**Section 6.1**). At this point in time there will be about 4x the availability of plantation hardwood than there is currently. With the huge investment in the establishment of hardwood plantations in Tasmania, the time is right to begin positioning for new products and new markets that will ultimately be available for such a significant forecast increase in wood availability.

A strong argument can be made for diversifying away from primarily pulpwood products to capitalise on opportunities for value adding through solid wood production, particularly clearwood and veneers, and engineered products such as LVL (laminated veneer lumber). Growth in reconstituted and glue laminated products favors plantation grown wood, with many of these products incorporating low grade wood and small diameter logs from fast grown, short rotation plantations[67].

Processing of plantation eucalypt solid wood products is a relatively recent technological advancement. A number of countries around the world have built highly efficient world-scale production units dedicated specifically to converting eucalypt plantation wood into sawn timber, plywood, veneer and laminated veneer lumber products.

7.1 Enhanced opportunities with wiser use of available wood

7.1.1 Increase intensive forest management

Intensive forest management (IFM) is the best way to maximise the output of quality timber aimed at high value markets. Under IFM, special thinning, pruning, fertilising and harvesting techniques are employed to maximise the scale, quality and economic value of plantation resources[68].

Pine clearwood

Management for the production of pine clearwood is outlined in **Table 16**. Clearwood is the ultimate product for finest grade, knot and blemish-free pine timber for uses such as picture framing, carpentry and furniture. Clearwood is one of the highest value plantation products (**Table 17**). Careful planting, pruning and forest management will create clearwood. The timber also requires skilled milling, drying and storage to ensure a craftsmen-quality final product. Currently around 26% of the public softwood plantation estate is managed under a clearwood regime with thinning and high pruning for veneer log production and projections indicate that the veneer supply from softwood plantations will reach an annual yield of 50,000 m^3 by 2010[69].

[67] ABARE (1999) Forest plantations on cleared agricultural land in Australia. Research Report 99.11
[68] Forestry Tasmania Annual Report 2003-03, p18.
[69] Banks & Clark (1997). Tasmania's plantation processing industry – job opportunities now and in the future.

Table 16: Tasmanian public softwood plantation clearwood management regime and wood yields (m^3/ha)

	First commercial thinning at 12 yrs	Second commercial thinning at 20 yrs	Clearfell at age 30	Total wood supply
Veneer log	0	0	162	162
Sawlog	0	20	182	202
Chiplog	40	8	4	52
Total	40	28	348	416

Data source: Banks & Clark (1997). Tasmania's plantation processing industry – job opportunities now and in the future.

Currently Tasmania has the only fully integrated clearwood sawmiller in Australia – TTC. TTC has supply contracts for 32,000 tonnes of pine logs from 2003-2010 and can produce product valued at up to \$1,800/m^3. The potential for clearwood manufacturing in the State has not reached its potential, particularly as 129,000 m^3 of softwood plantation logs were exported last financial year and 245,000 m3 the year before (**Table 10**).

Hardwood

It is assumed that 15% of hardwood planted on State forest will be high pruned to produce sawlogs (category 3)[70] and timber suitable for rotary peeling. The proportion of hardwood sawlogs sourced from plantations is expected to increase from 2017 onwards. There is also potential to produce sliced veneers from the highest quality plantation hardwoods and about 10,000 m^3 would be required to replace the current supply from native forests[71]. Private plantation owners are not obliged to produce high quality sawlog and much of the planting has been specifically focused on the production of short rotation pulpwood[72].

7.1.2 Aim for high value adding and high value markets

Currently plantation raw materials fetch anything from \$5-30 m^3 in royalty and are worth \$65-84 m^3 once transported to a point of export (**Table 17**). Manufacturing of the plantation timber locally increases the export value of the plantation product by as much as 20x (**Table 17**).

[70] Forestry Tasmania (2002). Review of sustainable high quality eucalypt sawlog supply from Tasmanian State Forest.
[71] Banks & Clark (1997). Tasmania's plantation processing industry – job opportunities now and in the future.
[72] Forestry Tasmania (2002). Review of sustainable high quality eucalypt sawlog supply from Tasmanian State Forest.

Table 17: Current examples of stumpage, mill door (or wharf) value and export value

P = plantation NF = native forest	**Stumpage ($/tonne)(a)**	**Mill door landed value (MDLV) ($/m3)(b)**	**Export ($/m3)(c)**
Raw materials			
P - Roundwood	15	65	65
P - Woodchips (softwood)(d)	5-10	50	65
P - Export softwood logs	10-20	70	70
NF - Export eucalypt peeler log	15	80	80
P - Woodchips (plantation hardwood)(d)	18-30	49	84
Processed materials			
P - Particleboard		50	370
P - MDF		50	395
P - Softwood sawn timber (rough)	20-30	70	440
P - Hardboard		50	500
P + NF - Pulp	5-30	50	700
P - Paper & paperboard		50	850
NF - Hardwood sawn timber (rough)	15-28	70	880
P - Softwood veneer	50-78	90	900
NF - Hardwood veneer	35-70	100	910
NF - Hardwood sawn timber (dressed)	25-45	53-100*	1,000
P + NF - Newsprint			1,050
P - Softwood sawn timber (dressed)	40-65	53-100*	1,090
P + NF - Printing & writing paper			1,160
P + NF - Plywood/LVL		80	1,400
P - Clearwood	50-78	90	up to 1,800

(a) Stumpage prices from: Private Forests Tasmania market information update
(b) Sustainable forest management report 01-02
(c) ABARE - Australian forest and wood product statistics – Sept and Dec quarters 2003
(d) Export woodchip price quoted is for 'green metric tonnes'
***MDLV depends upon level management and extent of pruning**

The current gross export value of Tasmania's plantation products is 1.08 billion (**Table 18**).

Table 18: Summary of current plantation products and estimated gross export value

	Volume	Value $/m3	Total $
Logs			
Hardwood export woodchips (t)	750,000	84	63,000,000
Softwood export pulpwood (t)	300,000	70	21,000,000
Export logs (m3)	129,000	70	9,030,000
Products			
Newsprint (tonnes)(b)	310,000	1,050	325,500,000
Paper (tonnes)(c)	302,000	1,160	350,300,000
Sawn timber & veneer (m^3)	232,000	1,000	232,000,000
MDF (tonnes)	120,000	395	47,400,000
Particleboard/panels (m^3)	42,000	370	15,540,000
Treated pine (m^3)	40,000	500	20,000,000
Total			**1,084,000,000**

7.1.3 Enhanced value from processing more resource locally

Current (as at December 2003) plantation timber production is approximately 2.5 million tonnes. Current export of plantation based timber currently amounts to an estimated 750,000 tonnes of hardwood pulpwood, 300,000 tonnes of softwood pulpwood and 130,000 m^3 of whole logs (softwood). A majority of the hardwood pulpwood is currently sourced from private land although a small proportion is wood that has been grown in conjunction with joint venture partners. The softwood pulp is however owned and managed under joint venture arrangements with established markets.

The following analysis provides examples of how local processing of exported material (not bound by joint venture agreements) could maximise jobs and wealth generation in Tasmania from the plantation estate.

Downstream processing 750,000 tonnes of export pulpwood into MDF

- 750,000 tonnes of pulpwood would enable the capacity for MDF production in the State to more than double to an estimated 300,000 tonnes/yr creating an estimated 265 new jobs for an estimated new investment of $200 million (refer **Table 20** for analysis).
- Value of the timber as export pulp (**Table 17**) $63 million
- Value of the timber as export MDF $119 million
- **Enhanced annual export value. $56 million**

Downstream processing the 130,000 m^3 of export logs into LVL or clearwood products

- Local processing of softwood logs currently exported would generate enough resource for establishment of a LVL (laminated veneer lumber) plant creating an estimated 110 jobs (estimated investment $50 million)(refer **Table 19** for analysis).
- Value of the timber as export logs (**Table 17**) $9.1 million
- Value of the timber as export LVL (Assuming a 70% recovery of product) $127 million
- **Enhanced annual export value. $118 million**
- Similar returns in terms of revenue and employment may be achieved through processing the export logs into softwood sliced veneers or clearwood sawn timber.

Summary

Processing locally the available plantation resource that is currently exported (and not subject to joint venture agreements) would require and achieve the following:

- new investment $250 million
- new jobs 375
- **increased annual value $174 million**

The increased annual value from downstream processing the exported plantation resource would enhance the value of Tasmania's plantation products by 16% from 1.08 billion to 1.26 billion.

7.1.4 Plantation manufacturing options – relative analysis of resource use, jobs and investment

The information presented in **Table 19** provides a picture of the resource consumption, capital expenditure jobs creation potential of several plantation timber downstream processing options. In **Table 20** the options are analysed and ranked according to efficiency of resource use and potential to maximise employment in relation to investment and resource use.

Table 19: Profile of investment, jobs and resource requirement of plantation timber processing plants

	Wood input required (m3/annum)	Capital expenditure ($ million)	Plantation area required	Jobs created
Veneer mill (softwood & hardwood)	50,000	80	9,000	110
Laminated veneer lumber (LVL) & plywood plant (softwood & hardwood)	120,000	50	12-20,000	110
Sawmill (softwood & hardwood)	400,000	85	35-40,000	240
Engineered strand lumber (ESL) (hardwood)	450,000	170	35-45,000	200
MDF and/or particleboard plant (softwood)	300,000	150	20-35,000	200
Kraft linerboard plant (softwood)	1,200,000	550	80-150,000	150
Pulp mill – closed loop, non-chlorine Kraft (hardwood)	3,000,000	1,100	125-250,000	300

Table 20: Relative analysis of resource, jobs and investment

	Jobs vs resource input	Relative analysis jobs vs resource input	Jobs vs investment	Relative analysis jobs vs investment
Pulp mill – closed loop, non-chlorine Kraft (soft/hardwood)	1.00E-04	1	2.73E-07	1
Kraft linerboard plant (softwood)	1.25E-04	1.25	2.73E-07	1
Elongated strand lumber (ESL) (hardwood)	5.56E-04	5.6	1.47E-06	5.4
Sawmill (softwood/hardwood)	6.00E-04	6.0	2.82E-06	10.3
MDF and/or particleboard plant (softwood/hardwood)	6.67E-04	6.7	1.33E-06	4.9
Laminated veneer lumber (LVL) & plywood plant (softwood/hardwood))	9.17E-04	9.2	2.20E-06	8.1
Veneer mill (softwood/hardwood)	2.2E-03	22	1.38E-06	5.1

Potential for engineered timber products

The information presented in **Table 20** demonstrates that production veneers followed by engineered and manufactured timber products such as MDF, LVL and ESL are the best options for optimising Tasmania's plantation timber resource in terms of employment, investment and resource consumption. Sawn timber ranked as the best option for optimising jobs according to investment. Construction of a pulp mill has the potential to significantly under-value the potential of the State's plantations and would be another example of a resource-hungry, low employment operation that would minimise Tasmania's options to adopt a range of innovative processing plants.

Veneer and rotary peeled veneer for production of LVL (laminated veneer lumber) and plywood are very attractive prospects for maximising the jobs return in relation to resource input and capital investment e.g. LVL will return 9x more jobs per tonne and veneer 22x more jobs per tonne of resource than a pulp mill (**Table 20**). Veneers do however require much more intensive plantation management than does pulp wood production. More information on engineered timber products, including ESL (elongated strand lumber) is given in **Appendix 2**.

LVL production is currently untapped in Tasmania and local processing infrastructure has not been established. Export of softwood plantation logs and native forest regrowth logs for peeling in Korea and China is a market that has increased rapidly in recent years, a move that is undermining Tasmania's resource potential for manufacturing this high value, high employment generating product. It is also arguable that in fostering the development of peeling technology in Asia we are undermining the viability of our own markets should the technology ever be established in the State.

7.2 How much more plantation timber will be available given no further expansion in the estate?

In 2004 the majority of Tasmania's plantation timber was harvested from plantations established up until 1989, a total area of 82,300 ha (**Table 21**). Since 1989 a further 140,400 hectares of plantations has been established, the timber from which will progressively become available from now until 2019. At that time, given no new plantations are established, an estimated 6,640,000 (tonnes + m3) of plantation timber will be produced annually, an increase of 170% on the current volume of 2,520,000 (tonnes + m3)(**Table 21**).

The extra timber available for processing in Tasmania is estimated in **Table 21** and equates to 2.75 million tonnes of hardwood. The analysis assumes that the current level of plantation timber use will be maintained but excludes joint venture wood. Joint venture wood has essentially been grown in partnership with Japanese and American multinational companies and is destined for export, primarily into a pulpwood market. As at 2003, 68% of softwood plantations & 6% of hardwood plantations were under joint venture contracts.

Table 21: Estimated plantation timber availability based upon no net increase in plantation establishment from 2004

	Current Situation 1989 plantation area at full production	**Scenario** 2004 plantation area at full production (ie 2019)	**Increase**	Subtract wood grown under joint venture contracts for export pulp	**Extra wood available** (at total plantation production from 2019)
Plantation area					
Softwood (ha)	42,400	76,100	(33,700) 80%		
Hardwood (ha)	39,900	146,600	(106,700) 270%		
Total (ha)	*82,300*	*222,700*	*(140,400) 170%*		
Annual production					
Softwood (tonnes + m3)	1,400,000	2,520,000	1,120,000	all	nil
Hardwood (tonnes)	1,120,000	4,120,000	3,000,000	250,000	2,750,000
Total (tonnes + m3)	*2,520,000*	*6,640,000*	*4,120,000*		*2,750,000*
Annual area harvested					
Thinning (ha)	2,240	6,100			
Clearfell (ha)	7,740	21,000			
Total (ha)	*10,100*	*27,100*	*(17,000) 170%*		

***As at 2003 68% of softwood plantations & 6% of hardwood plantations were under joint venture contracts (Table 3)**

7.2.1 Local downstream processing options and enhanced value

The options for use of the available plantation timber when the 2004 plantation estate has matured into useable product are extensive. As shown in **Table 21**, by 2019 there will be an estimated 2,750,000 tonnes/yr more plantation hardwood available than in 2004.

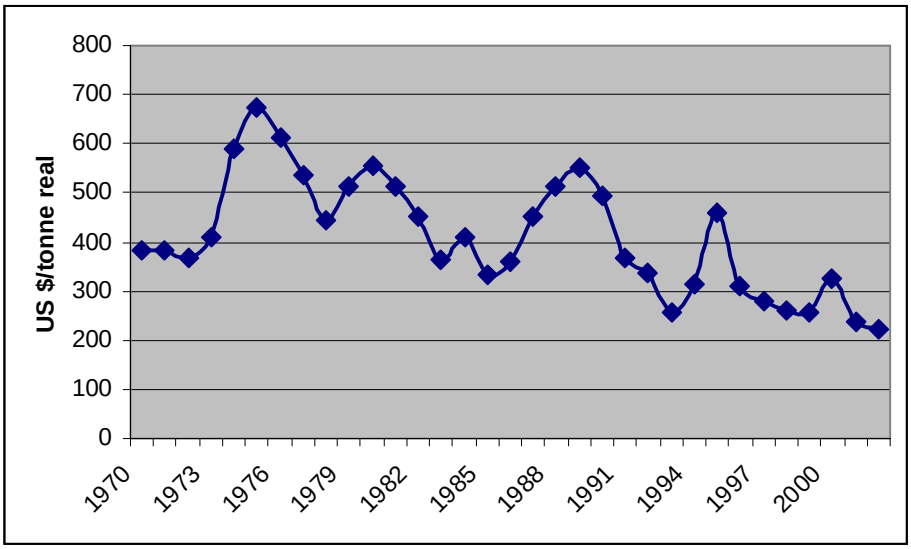
If the available timber was allocated to a new pulp mill it would consume all of this resource (**Table 19 & 22**) and create an estimated 300 new jobs for an investment of $1.1 billion. Alternatively a diversity of new enterprises including new MDF, LVL, ESL and hardwood sawmilling plants could be established (**Table 22**) for a combined investment of $770 million. The combined initiatives would require less resource than a pulp mill (2,000,000 tonnes) and create more jobs (an estimated 1,320 new jobs).

Table 22: Potential options for processing additional plantation hardwood resource available in full by 2019

	Wood input required (m3/annum)	Capital expenditure ($ million)	Jobs created
Option 1 – pulp mill			
Pulp mill – closed loop, non-chlorine Kraft	3,000,000	1,100	300
Total	**3,000,000**	**1,100**	**300**
Option 2 – range of initiatives			
2 x veneer mills	100,000	160	220
2 x laminated veneer lumber (LVL)/plywood plants	240,000	100	220
2 x sawmills	800,000	170	480
2 x engineered strand lumber plants	900,000	340	400
Total	**2,040,000**	**770**	**1,320**

The pulp mill option is made less attractive by the fact that the real world price for chemical wood-pulp is volatile and has been in decline in real terms since 1970 (refer to **Figure 6**).

Figure 6: Real price for world exports of chemical wood-pulp
(Prices deflated by US CPI 1982-84=100



7.3 Wood availability in 20 years given forecast expansion in plantation estate

Given a continuation of plantation establishment at the current rate the wood availability forecast in 20 years time is (based on data in **Table 15**):

Softwood availability	1,500,000 tonnes/yr
Hardwood availability	6,300,000 tonnes/yr

Under this scenario it would appear that enough plantation hardwood would be available to feed a pulp mill. This however is not a favoured scenario as achieving this level of plantation timber production will come at the expense of further conversion of native forests and at the expense of other processing options that make much greater sense in terms of investment, resource use and employment – as per the previous section.

7.3.1 Farm forestry and plantation expansion

Farm forestry is the term applied to the use of trees on privately owned farms, excluding large industrial forestry activity. Farm forestry plays an important role in land management in Tasmania and is coordinated by Private Forests Tasmania (PFT) a State Government funded authority[73].

The 'Farm Forests Project' funding under the Commonwealth Natural Heritage Trust, which assisted landowners in farm forest planning, concluded in December 2002. Under this Project, PFT prepared 130 plans in consultation with private landowners to

[73] www.abs.gov.au - Statistics Tasmania – Farm Forestry

integrate new plantations with other agricultural activities. Successful implementation of these plans increases long-term sustainability and productivity of native forests and provides additional livestock and crop shelter as well as increasing environmental benefits from integrated plantations. For example, strategic tree planting addresses weed control in 60% of plantation plans as well as salinity (30% of plans) and erosion (10% of plans)[74].

Under the project, longer rotations associated with sawlog and veneer products were promoted to optimise both environmental benefits (such as weed control, and reduction in salinity and erosion) and potential financial return for the grower. Direct seeding of native species was also actively promoted because of its low cost compared to direct planting of seedlings. It is also suited to situations where a large amount of seed species are readily available and a range of species may need to be inter-planted to mimic natural vegetation communities, especially for shelter and amenity purposes[75].

Farm forestry obviously has a lot of benefits and can create a win-win scenario if undertaken to enhance the environmental benefits and increase farm productivity, health and cash flow. However caution must be exercised such that tree lots do not adversely affect local water yield, stream flow and arable land productivity.

Although farm forestry has the potential to compliment wood production from plantation forests it is unlikely that it can be conducted on a scale suitable to provide the feedstock for a pulp mill. For a start, a pulp supply option is not attractive to the grower because pulp is a relatively low value product. Small tree lots on farms are a good option for intensive management to produce high value product such as clearwood and veneers. Additionally, plantations grown in consolidated units minimise operational costs through economies of scale. Easy access to infrastructure such as road, rail, port facilities and/or processing plants is a very important consideration. Small tree lots on farms are less convenient than consolidated holdings in terms of their dispersed location and reduced transportation efficiency in respect to maintaining high volume resource flow to a pulp mill.

[74] Ibid
[75] Ibid

8.0 Plantation issues of economic and social importance

Despite the positive benefits of plantation establishment in terms of generating manufacturing initiatives, replacement of commodities traditionally sourced from native forests and potential to improve farm health and diversify production, there are many serious environmental factors that need to be taken into account. Paramount of these issues in Tasmania is the conversion of native forests for plantation establishment, an issue covered earlier in **Section 3.6**. A few further issues are expanded upon below but in short the issues are:

- reduced stream flow and consumption of groundwater
- chemical contamination of waterways following pesticide application
- poisoning of wildlife with 1080 baits used in browsing control
- soil compaction and erosion caused by harvesting operations
- soil nutrient decline and acidification
- visual impact following clearfelling.

8.1 Use of poisons

The establishment of eucalypt plantations in Tasmania has become dependant upon the use of poisons to control mammal browsing, herbicides to control weeds, fungicides to control pathogens and insecticides to control insect attack. There has been ongoing controversy in Tasmania about the use of these poisons, particularly surrounding the use of 1080 because it inflicts such a painful, cruel death and impacts non-target species either through direct consumption or feeding on carcasses of poisoned animals. The use of forestry poisons has become increasingly controversial recently with claims that aerial spraying of plantations has had impacts downstream causing death of oysters and is linked to facial tumors in Tasmanian devils[76].

The target species for1080 poison are mammals that severely damage young growing seedlings such as the brushtail possum, Tasmanian pademelon, Bennett's wallaby, and European rabbit[77]. 1080 does not appear to directly affect Tasmanian devils[78]. Total 1080 use by Forestry Tasmania in 2001-02 was 9.6 kg at an average rate of 0.21 g/hectare[79].

Herbicides are used to control weeds, grasses and native shrubs that compete directly with the plantation shrubs for nutrients and light. To control these plants a range of herbicides is used together with a growth inhibitor called Terbacil. Herbicides used by Forestry Tasmania are listed in **Table 23** with other forestry chemicals listed in **Table 24**.

[76] Scammell, M. (2004). Environmental problems – Georges Bay, Tasmania. Available from www.tfic.com.au
[77] Forestry Tasmania sustainable forest management report 2001-02, p41.
[78] Nick Mooney – Tasmanian Country 2/7/04 p7.
[79] Forestry Tasmania sustainable forest management report 2001-02, p42.

Table 23: Herbicides used by Forestry Tasmania

Product name	Herbicide	Poison schedule rating	WHO classification
Velpar	Hexazinone	5	Class 111 slightly hazardous
Velmac	Hexazinone	5	Class 111 slightly hazardous
Garlon, Grazon	Triclopyr	6	Class 111 slightly hazardous
Lontrel	Clopyralid	5	Unlikely to be hazardous
Roundup	Glyphosate	5	Unlikely to be hazardous
Eclipse	Metosulam	6	Unlikely to be hazardous
Brush-off	Metsulfuron - methyl	UC	Unlikely to be hazardous
Brushkiller	Metsulfuron - methyl	UC	Unlikely to be hazardous
Met 600	Metsulfuron - methyl	UC	Unlikely to be hazardous
Mako	Sulfometuron - methyl	5	Unlikely to be hazardous
Oust, Eucmix	Sulfometuron - methyl	5	Unlikely to be hazardous
Success	Spinosad	UC	Unlikely to be hazardous
Eucmix	Terbacil	5	Unlikely to be hazardous

In 2002-03 the following application of pesticides was used in plantations on State forest:

- **schedule 5 0.78 kg/ha**
- **schedule 6 0.002 kg/ha**

Data source: Forestry Tasmania sustainable forest management report 2002-03, p46-47.

Table 24: Summary of biocides reportedly used to protect plantations

Chemical	**Function**	**Solubility**	**Aquatic toxicity** (from Material Data Safety Sheet)	**Tumours***
Glyphosate	Herbicide	Soluble	11.1-21.6 mg/L	No
Sulfometuron - methyl	Herbicide	Soluble	>150 mg/L	No
Clopyralid triisopropanolamine	Herbicide	Soluble	Low toxicity	No
Atrazine	Herbicide	Low solubility	Low toxicity	Yes
Simazine	Herbicide	Low solubility	16-71 mg/L (fish)	Yes
Carbaryl	Insecticide	Soluble	6-10,000 µg/L	Unclear
Maldison	Insecticide	Partially	1-300 µg/L	No
Chlorpyrifos	Insecticide	Insoluble	3 µg/L (vertebrates)	No
Dimethoate	Insecticide	Low solubility	4.7-60 mg/L	No
Alphacypermethryn	Insecticide	Insoluble	0.004-3.6 µg/L	No
1080	Vertebrate pesticide	Unknown	Unknown	Unknown
Chlorothalonil	Fungicide	Soluble	44-62 µg/L (fish & invertebrates)	Yes
Terbacil (Paclobutrazol)	Growth regulator	Unknown	Unknown	Unknown

Source: Scammel, M (2004) Environmental problems Georges Bay – www.tfic.com.au

***At least three of the chemicals used to protect plantations have been associated with tumour development in life time exposure studies with rodents.**

The insecticide at the centre of the controversy over aerial spraying in the Georges Bay catchment is Alpha-cypermethryn which is potentially toxic at considerably lower concentrations than can be measured. Alpha-cypermethryn is toxic to some organisms at 4 parts per trillion and the lowest concentration that can be measured is 50 parts per trillion in water[80]. Testing for environmental residues of the chemical is made more difficult as it rapidly degrades in the environment and in organisms it is rapidly metabolised and depurated[81].

The current controversy in the Georges Bay catchment, and the significant implications for mortality or tumors in aquatic fauna, has lead to calls for a moratorium on the use of plantation chemicals under a precautionary approach until the chemicals are deemed safe to use. The Australian Medical Association's Tasmanian president Michael Aizen called for the Government to act immediately in the interests of public health and ban aerial spraying.

The primary method of applying plantation chemicals is by aerial spraying which allows quick treatment of large areas. The chemicals are usually applied as a cocktail to enhance their effectiveness and presumably to decrease costs[82]. There is significant risk associated with mixing chemicals as it may lead to unknown reactions and increase toxicity or environmental persistence.

Key questions arising:

- Who is liable in terms of potential human health effects from use of chemicals in catchments that are also used for water supply and food?
- Is the ongoing reliance on plantations sustainable if use of current chemicals and aerial spraying is banned?
- Is 'restoration forestry' now a realistic option to restore plantation areas back to diverse native forest systems that have more checks and balances against predator attack?

8.2 Water yield impacts

The afforestation of agricultural and pastoral areas, if conducted on a sufficiently broad scale, will profoundly influence the hydrology of catchments, particularly in respect to reducing water yields and groundwater recharge[83]. Changes in the seasonal distribution of runoff, the timing and magnitude of peak flows, and the persistence of low flows can also be expected.

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[80] Scammell, M. (2004). Environmental problems – Georges Bay, Tasmania. Available from www.tfic.com.au, p8.
[81] Ibid
[82] Scammell, M. (2004). Environmental problems – Georges Bay, Tasmania. Available from www.tfic.com.au
[83] Vertessey, R. (2000). Impacts of plantation forestry on catchment runoff. In Proceedings of the National workshop - plantations, farm forestry & water, Melbourne July 2000.

Evapotranspiration rates are higher in native forests and plantations than in pastures and crops[84]. For areas with 800 mm mean annual rainfall, mean annual runoff may decline by up to 165 mm under eucalypts and up to 210 mm under pines. For areas with a mean annual rainfall of 1,200 mm, the mean annual runoff reductions may be 265 and 350 mm[85]. Depending upon the plantation productivity, their extent of cover and the management regime, the effects may be less.

It has been stated that catchments with less than 20% area planted exhibit little effect on water yield. There is strong scientific evidence that the magnitude of catchment response is proportional to the percentage of the catchment planted. This relationship is less certain where only small proportions of catchments are planted. In catchments under 1,000 ha, where less than 20% is planted to forest plantations and there is no rainfall gradient within that area, it is difficult to measure a statistically significant effect on catchment yield. In larger catchments, the proportional relationship breaks down for a number of reasons, particularly the variation in annual rainfall across the catchment[86].

Only two Tasmanian river catchments contain plantation areas at greater than 20%: the Cam and Emu River catchments in the north of the State which have plantations at 26.9% and 29.5% of the catchment area respectively. Other catchment plantation areas are given in **Section 3.9.2**.

Water yield impacts of plantations are relatively low until canopy closure. Water yield reductions tend to peak at about 10 –20 years, possibly later in drier environments. It will also fluctuate over time depending on the forest management regime e.g. thinning. Where a plantation is re-established on an existing plantation forest site there will be a net increase in water yield until the plantation closes canopy[87].

The location and planting design of trees may increase or decrease water yield in catchments. In certain circumstances plantations established close to drainage lines will use proportionally more water than those established further away. Plantations established in contour banded configurations may also use more water than the same area of plantations established in blocks or perpendicular to the contour[88].

It may be argued that the establishment of plantations on cleared land is simply restoring deep-rooted perennials to a portion of the landscape and therefore restoring the hydrological balance that existed prior to land clearance.

There is no universal formula for summarising the relationship between trees and catchment hydrology.

[84] Ibid
[85] Ibid
[86] Bureau of Rural Sciences, Proceedings of a meeting held on Friday 24/10/03 - the impact of forest plantations on water yield - a statement clarifying key scientific issues.
[87] Bureau of Rural Sciences, Proceedings of a meeting held on Friday 24/10/03 - the impact of forest plantations on water yield - a statement clarifying key scientific issues.
[88] Ibid

8.3 Carbon

The potential to use plantations as a means of storing carbon to meet targets set under the Kyoto Protocol, and thus creating a tradable carbon credit, has raised the interest of a new set of potential investors in plantation establishment[89]. Companies likely to incur a significant carbon debt are evaluating the potential of plantations as a means of reducing their liability.

However, there are significant doubts about the reality of carbon storage in plantation crops and their products. Often large scale tree plantations replace forests and are hence a direct cause of deforestation. Before they become a temporary carbon sink, plantations release large amounts of carbon previously stored in the forest and forest soils they replace. Forest soils and the organic matter stored in them typically contain three to four times as much carbon as the vegetation above. When ground is cleared for forest planting, rotting organic matter in the soil releases a surge of CO_2 into the air. This release will exceed the CO_2 absorbed by growing trees for at least the first 10 years[90] old forests actually accumulate more carbon than young plantations.

Most of the timber produced by plantations is converted into pulp, the production and transport of which emits large amounts of CO_2. Most of the resulting paper has a short lifespan and the CO_2 it stores returns to the atmosphere relatively rapidly as do ultimately all products of plantations.

In short, it appears that industrial monoculture tree plantations are not a plausible candidate as carbon sinks.

APPENDIX 1 – Plantations by river catchments

Appendix - Plantation area by catchments, 2002

Catchment name	area (ha)	plantation	area (ha)	% catchment
Arthur	250,542	hardwood	15,562	6.2
		softwood	1,070	0.4
		Arthur Total	**16,632**	**6.6**
Black-Detention	64,616	hardwood	2,023	3.1
		softwood	133	0.2
		Black-Detention Total	**2,156**	**3.3**
Blythe	37,718	hardwood	2,650	7.0
		softwood	379	1.0
		Blythe Total	**3,029**	**8.0**
Boobyalla-Tomahawk	65,219	hardwood	485	0.7
		softwood	2,343	3.6

[89] Stanton, R. (2000) An overview of timber plantation development in Australia – drivers, trends & prospects. In Proceedings of the National workshop - plantations, farm forestry & water, Melbourne July 2000.
[90] New Scientist 28/10/02.

		Boobyalla-Tomahawk Total	**2,828**	**4.3**
Brumbys-Lake	150,855	hardwood	262	0.2
		softwood	47	0.0
		Brumbys-Lake Total	**309**	**0.2**
Cam	28,859	hardwood	6,199	21.5
		softwood	1,571	5.4
		Cam Total	**7,770**	**26.9**
Clyde	111,752	hardwood	9	0.0
		softwood	605	0.5
		Clyde Total	**614**	**0.5**
Derwent Est-Bruny	109,149	hardwood	0	0.0
		softwood	540	0.5
		Derwent Est-Bruny Total	**540**	**0.5**
Duck	55,242	hardwood	2,533	4.6
		softwood	23	0.0
		Duck Total	**2,556**	**4.6**
Emu	25,462	hardwood	6,127	24.1
		softwood	1,396	5.5
		Emu Total	**7,523**	**29.5**
Forth-Wilmot	117,961	hardwood	4,417	3.7
		softwood	1,828	1.5
		Forth-Wilmot Total	**6,244**	**5.3**
Furneaux	188,791	softwood	252	0.1
		Furneaux Total	**252**	**0.1**
George	61,500	hardwood	2,537	4.1
		softwood	37	0.1
		George Total	**2,574**	**4.2**
Gordon-Franklin	589,357	hardwood	29	0.0
		Gordon-Franklin Total	**29**	**0.0**
Great Forester-Brid	78,301	hardwood	2,464	3.1
		softwood	7,669	9.8
		Great Forester-Brid Total	**10,133**	**12.9**
Huon	380,790	hardwood	5,971	1.6
		softwood	1,230	0.3
		Huon Total	**7,201**	**1.9**
Inglis	61,570	hardwood	5,958	9.7
		softwood	3,848	6.2
		Inglis Total	**9,806**	**15.9**
Jordan	125,325	hardwood	274	0.2
		softwood	456	0.4
		Jordan Total	**730**	**0.6**
King-Henty	179,271	hardwood	407	0.2
		softwood	1,178	0.7
		King-Henty Total	**1,585**	**0.9**
King Island	426,091	hardwood	286	0.1
		softwood	188	0.0
		King Island Total	**474**	**0.1**
Leven	72,740	hardwood	7,658	10.5
		softwood	1,999	2.7

		Leven Total	**9,657**	**13.3**
Little Forester	35,356	hardwood	4,097	11.6
		softwood	2,519	7.1
		Little Forester Total	**6,616**	**18.7**
Little Swanport	87,892	hardwood	192	0.2
		softwood	306	0.3
		Little Swanport Total	**497**	**0.6**
Lower Derwent	160,374	hardwood	2,157	1.3
		softwood	12,007	7.5
		Lower Derwent Total	**14,164**	**8.8**
Macquarie	273,244	softwood	6	0.0
		Macquarie Total	**6**	**0.0**
Meander	156,863	hardwood	7,909	5.0
		softwood	452	0.3
		Meander Total	**8,360**	**5.3**
Mersey	190,891	hardwood	6,296	3.3
		softwood	4,802	2.5
		Mersey Total	**11,098**	**5.8**
Montagu	47,607	hardwood	2,101	4.4
		Montagu Total	**2,101**	**4.4**
Musselroe-Ansons	97,209	hardwood	813	0.8
		softwood	1,144	1.2
		Musselroe-Ansons Total	**1,957**	**2.0**
Nelson Bay	86,755	hardwood	869	1.0
		softwood	3	0.0
		Nelson Bay Total	**872**	**1.0**
North Esk	106,550	hardwood	9,564	9.0
		softwood	542	0.5
		North Esk Total	**10,107**	**9.5**
Ouse	148,238	hardwood	61	0.0
		softwood	210	0.1
		Ouse Total	**270**	**0.2**
Pieman	414,893	hardwood	1,278	0.3
		softwood	24	0.0
		Pieman Total	**1,302**	**0.3**
Pipers	75,370	hardwood	3,203	4.3
		softwood	2,494	3.3
		Pipers Total	**5,697**	**7.6**
Pitt Water-Coal	91,977	hardwood	312	0.3
		softwood	1,261	1.4
		Pitt Water-Coal Total	**1,572**	**1.7**
Prosser	114,850	hardwood	409	0.4
		softwood	175	0.2
		Prosser Total	**584**	**0.5**
Ringarooma	98,284	hardwood	3,971	4.0
		softwood	2,700	2.7
		Ringarooma Total	**6,670**	**6.8**
Rubicon	71,755	hardwood	3,211	4.5
		softwood	4,233	5.9

		Rubicon Total	**7,444**	**10.4**
Scamander-Douglas	68,656	hardwood	1,257	1.8
		softwood	2,299	3.3
		Scamander-Douglas Total	**3,557**	**5.2**
South Esk	334,951	hardwood	2,640	0.8
		softwood	9,119	2.7
		South Esk Total	**11,759**	**3.5**
Swan-Aspley	136,032	hardwood	155	0.1
		Swan-Aspley Total	**155**	**0.1**
Tamar Estuary	107,439	hardwood	3,417	3.2
		softwood	96	0.1
		Tamar Estuary Total	**3,513**	**3.3**
Tasman	92,706	hardwood	809	0.9
		softwood	1,338	1.4
		Tasman Total	**2,147**	**2.3**
Upper Derwent	354,134	hardwood	3,684	1.0
		softwood	5,558	1.6
		Upper Derwent Total	**9,242**	**2.6**
Welcome	67,480	hardwood	1,976	2.9
		softwood	1	0.0
		Welcome Total	**1,977**	**2.9**

Data source: Private Forests Tasmania 2002, Forest Group Data v.2, Private Forests Tasmania, Burnie, www.privateforests.tas.gov.au

APPENDIX 2 – Profiles of selected plantation products

Medium Density Fibreboard (MDF)

MDF is a wood based composite material that draws on the usage of wood fibres, rather than particles or veneers to produce board or sheet products. It is typically made as a board type product, though it's use in mouldings and increasing use as a structural product will see beam type products proliferate. It is replacing the use of particleboard in uses such as furniture manufacture, cabinet making, joinery, craft work and flooring. Its advantages include high strengths, ease of machining, good weathering properties, and the ability to be made from a wide variety of fibrous products.

MDF is a wood based composite. The primary constituant is a softwood that has been broken down into wood fibres; that is the very cells (tracheids, vessels, fibres and fibre-tracheids), which are far smaller entities than those used in particleboard. In Australia the main species used in the production of MDF is plantation grown radiata pine, but a wide variety of softwood species will constitute a suitable base for MDF production, though if too many species are used too great a variation in the properties of the finished MDF will result.

MDF was originally developed exclusively for furniture. But it's weight strength and aesthetics have seen its proliferation to many uses. It is used extensively in kitchens

and for mouldings, and in bathroom environments. It's use as an exterior cladding for housing has successfully been trialed, and structural applications are increasing. The Fire resistance of MDF is also better than that of timber

Laminated Veneer Lumber (LVL) Laminated Strand Lumber (LSL)

LVL and LSL are an engineered structural materials that are manufactured by bonding wood strands or veneers that are rotary peeled together with a structural adhesive to form a solid member of end sections and length limited only by manufacturing, transport and handling capabilities. The grain direction of each veneer or strand is usually orientated parallel to the length of the piece but may be cross-banded for specialty applications. Because of its laminated structure, dispersing strength reducing characteristics more evenly, LVL and LSL have higher bending strength and stiffness than the equivalent solid timber section of the same species. LVL and LSL are produced in the seasoned condition. Design Ideas and Structural Form LVL and LSL products are used predominantly for residential and industrial structural building applications such as floor joists, lintels, purlins, roof truss components, etc. The ability to cut different shapes from productions “billets” allows for structural innovation using angular and curved shapes. While it’s unfinished, manufactured appearance may limit its use for high quality appearance applications, the use of opaque finishes will facilitate the use of LVL or LSL in creating visually exciting structural forms.

Waste is minimised with LVL production and up to 70% of the tree can be converted to finished product.

Engineered strand lumber (ESL)

Lignor is a Research and Development Company established in 1999. It has patented technology to produce very strong engineered strand lumber, ESL. This technology is German in origin where it is used to downstream softwoods and is known there as long strand lumber, LSL. Since most of the world’s softwoods are held by multi-national companies, Lignor decided to develop the technology to use on eucalypts, especially blue gums. It identified Western Australia as having the most advanced plantation resource at this time and has opted for a plant at Albany. Lignor considered Tasmania but the initial response from industry was not encouraging and on paper decided that the concentration of blue gums was patchy and there was not sufficient resource with a diameter between 150-400 currently available.

- The technology can be used on plantations planted and managed for pulpwood as it uses the same age trees and rotation and same management regime.
- The technology converts 70% of the tree to finished product and the remaining 30% is used for biomass fuel for drying in the plant.
- The lumber product is equivalent in strength to a 90 year old tree.
- The product is a construction timber engineered for structural purposes.
- The plant can produce any product between 6mm and 90 mm thick, up to 2.7 metres wide and up to 15 metres long. It can, for example, produce bracing board at 6mm or flooring at 15-16 mm or a beam at 90 mm thick.
- The plant uses 450,000 tonnes of timber per year.
- It will employ 150 directly in the plant and another 50 in the field.

- The investment is for $170 million.
- The products will be Engineered Strand Lumber and Engineered Strand Board.
- The market is established.
- It generates $1,500 per cubic metre compared with $140-$150 for woodchip.

Environmentally it is a dry process and so there is no wet waste. There will be atmospheric emissions from combustion of wood waste and evaporation from water in wood. The resin when it reacts with wood is benign. It is not a toxic resin.
The WA government and opposition support the project
The only government support that has been requested is for site infrastructure assistance.