Report

Economic Impacts of Potential Forest Industry Developments in Tasmania

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Prepared for

Forests and Forest Industry Council

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Abbreviations

Abbreviation	Description
bdmt	bone dry metric tone
ESL	engineered strand lumber
FFIC	Forests and Forest Industry Council
LVL	Laminated veneer lumber
m^3	cubic metre
MW	megawatt
MWh	megawatt hour
pa	per annum
RECs	Renewable Energy Certificates
TFCA	Tasmanian Forests Contractors Association
TCFA	Tasmanian Community Forestry Agreement

Executive Summary

Over the next 10 years, the Tasmanian forest industry has the opportunity to make a range of potential investments in new processing facilities. These potential investments are a result of changes in resource availability and shifts in timber markets. URS Forestry has been engaged by the Forests and Forest Industry Council of Tasmania (FFIC) to assess the high level economic impacts of these new investments.

Tasmania has extensive plantation and native forest resources. Over the next decade the availability of plantation hardwood resources is expected to expand considerably while volumes available from native forests will decline. The expansion in plantation resource availability will provide a net increase in volumes of hardwood pulpwood of around 2.3 million tonnes per annum (pa). The availability of hardwood plantation hardwood sawlogs and peeler logs will increase by more than 500,000 m^3 pa by 2020. While this is more than the decline in the volume of sawlogs available from native forests, the nature of the resource means that plantation logs are not a direct substitute for native forest sawlogs. New investments will be required to process the plantation logs. Further, the viability of the new processing investments will depend on quality of the plantation logs, over which there is considerable uncertainty.

The availability of softwood sawlogs is also expected to increase by around 165,000 m^3 pa by 2020. There is also the opportunity to harvest biomass as part of forest operations and indicative estimates suggest that there could be around 2.5 million tonnes pa of hardwood biomass and around 430,000 tonnes pa of softwood biomass available for harvest in Tasmania.

URS Forestry previously examined market opportunities for the Tasmanian forest industries in two reports: 'Markets and Market Prospects for the Forest Products Industry in Tasmania' (URS 2009a) and 'Global Climate Change and the Tasmanian Forest Products Sector' (URS 2009b). This report identifies the direct employment and income impacts associated with investments in new processing opportunities based on the most attractive market opportunities previously identified. Key investments considered are:

- **A hardwood kraft pulpmill** – based on increasing availability of hardwood pulpwood;
- **An engineered strand lumber (ESL) plant** – a 'Lignor' type mill also based on increasing volumes of available hardwood pulpwood;
- **New plantation hardwood sawmills** – two options are considered for hardwood sawmills to utilise plantation grown sawlogs; one which involves investment in three new mills based on reciprocated sawing systems or a single larger scale mill based on a linear sawing system;
- **Hardwood plywood** – expansion of current hardwood veneer production to plywood;
- **Softwood sawn timber** – additional softwood sawmilling capacity in existing mills to process increased volumes of available softwood sawlogs; and
- **Bioenergy** – estimates of available biomass suggest that there are sufficient resources to support a number of bioelectricity and wood pellet plants. It is difficult to predict what combination of new plants might result from new investment but indicative impacts were estimated based on three 30 MW bioelectricity plants and one export oriented wood pellet plant. These plants together would use around 50% of estimated available biomass resources.

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As highlighted in the earlier reports there is a wide range of potential options that might offer opportunities in the longer term that are not considered in this analysis. In particular, developing technologies combined with the pricing of carbon could result in new uses for wood biomass such as biochar, biofuels and industrial carbon.

There is also likely to be many smaller scale wood processing investments in Tasmania that have not been included in this analysis. These will include a range of investments by existing wood processors that will be undertaken as part of maintaining ongoing operations such as machine upgrades, expansion and new value adding processes. There is also likely to be a range of investments in new smaller scale wood processing operations e.g. in speciality timber production.

For each potential industry development option considered, high level economic impacts were estimated from a range of available information on the scale, capital expenditure, employment, and income generation of existing and proposed developments. URS has not undertaken detailed economic modelling of the new processing investments on the Tasmanian economy. The estimates of future income generated by investments are based on prevailing product prices expressed in current dollars. Similarly, the analysis of potential investments is based on identified market opportunities. Detailed feasibility assessments or the ability of particular options to attract investment funds were not explicitly included in the analysis.

If all of the opportunities identified in this analysis were implemented over the next decade they would require new capital investment of more than $2.1 billion, generate annual gross income of more than $1.2 billion and create around 800 jobs in the mills. Table 1 summarises the direct economic impacts from each of the new investments. These impacts represent income and employment that would be generated from the forest industries as a result of the new investments.

Table 1 Summary of income and employment impacts of new processing investments

Facility	Capital investment ($ million)	Annual direct income ($ million)	Long term employment in new mills (number of jobs)	Input volume of wood (million m^3 or t pa)
Hardwood pulp mill	1,450	750	290	4 Mt
ESL plant	225	290	150	0.55 Mt
Hardwood sawmilling - 3 reciprocated mills	60	50	200	0.24 Mm^3
Hardwood sawmilling - 1 linear mill	65	50	65	0.25 Mm^3
Hardwood plywood [(a)]	15	20	50	0.25 Mm^3
Softwood sawmilling	10	30	30	0.165 Mm^3
Bioenergy – (based on indicative 3 bioelectricity plants and one export wood pellet plant)	370	120	165	1.15 Mm^3
Total (reciprocated hardwood sawmills option)	**2,130**	**1,260**	**885**	
Total (linear hardwood sawmill option)	**2,135**	**1,260**	**750**	

(a) Hardwood plywood production based on utilising output from existing veneer mills. Input volume represents log input to exiting veneer mills. Income and employment represent additional impacts compared to veneer production.

Source: URS estimates, Gunns (2006a), Gunns (2006b), Stanford (2006)

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In addition to the income and employment generated directly in the new processing mills outlined in this study, income and employment are also directly generated through linkages both up and down the product chain e.g. in harvest and haulage, further processing, transport and associated services, as well as indirectly though economic multiplier effects. The values of the direct linkages are included in the estimates of income (gross value of output) for each processing facility as they include the values of all inputs in the production process. The investments would also create considerable indirect income and employment through economic multiplier effects.

The total direct and indirect economic impacts have not been estimated for each of the potential mill investments as part of this study. However, economic modelling undertaken as part of the impact assessment of a Tasmanian pulp mill provides an illustration of the potential size of the multiplier impacts for a new pulp mill investment. Stanford (2006) estimated that a pulp mill would generate around 1700 jobs throughout the Tasmanian economy. This estimate includes direct and indirect employment. While the mill would employ an estimated 290 people, it would also generate direct employment both up and down the supply chain. For example, by supporting the harvesting of up to 4 million tonnes of pulpwood per annum a pulp mill would generate significant jobs in forest management, harvesting and haulage. Further, the extensive links to the local economy that large processing operations such as a pulp mill have, suggest that income and employment multipliers are likely to be higher than for other types of processing operations.

Employment and income multipliers for the other investments were based on an indicative average multiplier of two which is commonly used for the forest industry in Australia. On this basis it could be expected that the other investments would generate at least another 1000 jobs and around $1 billion in direct and indirect income. This is a conservative estimate for jobs as the employment multiplier is applied only to jobs in the processing operations and not other direct jobs up and down the supply chain. Thus all of the investments including the pulp mill could be expected to generate more than 2,700 jobs and annual income of more than $2 billion pa. The following outlines some examples of the types of economic linkages that would help generate these impacts:

- **Engineering services** – the development of the types of mills identified would generate significant work for engineering services. These would typically include electrical, mechanical, civil and structural services required in design and construction of the mills as well as ongoing operation of the mills e.g. it is common for engineering services for mill maintenance to be contracted to specialist engineering services firms, and project engineering services in the construction phase of a project commonly represent 2-5% of the value of the capital investment.
- **Computer services** – all of the proposed mills would require substantial support for computer systems incorporated into the production process. These services would also include computer systems for stock movements, sales and marketing as well as accounting. These systems are commonly supported by local computer specialists.
- **Accounting and administration services** – all of these developments would create considerable demand for local accounting and administration services e.g. this would likely include provision of external accounting services including audit activities, and support for administration systems in the mills including implementation and audit of Australian standards.
- **Financial services** – the development and operation of the new investments would employ financial service providers in both providing initial capital financing as well as ongoing provision of finance for existing and new equipment. It is likely that the larger mills could have dedicated locally based financial managers;

- **Transport** – the mills would generate large demands for transport services including for inputs (in addition to log transport) as well as for outputs. For example, Gunns estimated that its proposed Tasmanian pulp mill could generate road freight output of around $15 million pa. There will also be additional need for services delivering road maintenance and upgrade.
- **Training services** – employees at the new mills will require significant amounts of training which in many cases is likely to be supported by TAFE and other training institutions as well as private training providers.
- **Accommodation and housing** – all mills will generate additional business for the local accommodation industry as a result of visitors to the mill. Similarly, some proportion of new workers employed at the mills will require new housing to be constructed.
- **Utility supply** – all of the mills require significant supplies from local utility suppliers including electricity, gas and water. For example, water will be required for operation of kilns in hardwood sawmills and treatment of softwood sawn timber, and large quantities of water are required for the pulp mill. It has been estimated that water supply and effluent disposal expenditures for the proposed Tasmanian pulp mill will amount to $3.6 million pa over the life of the mill.
- **Environmental services** – the construction and ongoing operation of the mills typically require provision of environmental assessment and monitoring services. These services are commonly contracted out to specialist providers.
- **Chemicals (including glues)** – many of the mills will require significant supplies of chemicals and glues. For example softwood sawmills use treatment chemicals and the plywood and ESL mills will require supplies of resins. It is estimated that Tasmanian basic chemical industries will grow by $8 million by 2030 as a result of the proposed Tasmanian pulp mill.
- **Mechanical services** – the mobile plant incorporated into all the mills such as loaders, fork lifts and company cars will generate additional work for local mechanical service suppliers. For example, the harvesting of biomass will require servicing and supply of machines for chipping or grinding forest residue.
- **Labour services** – the mills are likely to use the services of labour supply companies to source skilled workers.
- **Community services** – where rural populations increase as a result of new developments, there is potential to attract or retain investment in community services, such as schooling, health services and community activities such as sporting facilities.

There may be some structural adjustments that could reduce the net effect of these impacts. In particular, structural adjustment in the hardwood sawmilling industry could be expected to change the net impacts but also increase investment in new sawmills. Further, uncertainty over the quality of hardwood plantation logs, in particular the potential for low recoveries from *Eucalyptus nitens* plantation sawlogs (Innes *et al* 2008), could adversely influence the viability of new hardwood sawmilling investments. This highlights the need for ongoing research to address identified problems especially internal checking in drying of plantation hardwood and the identification of different processing alternatives to traditional sawing and seasoning.

Further, the combination of the hardwood pulp mill and ESL investments will divert some pulpwood from export chips, which is estimated to result in a loss of export income of around $240 million pa in favour of an increased income from domestic processing of around $950 million pa, a net increase of $710 million pa. Similarly, the scenario outlined for hardwood plywood production would result in a net increase in value of production (compared to veneer production) of around $20 million pa.

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The increase in available resources in Tasmania will create opportunities for the harvest and haul industry in Tasmania. However, these are tempered by a reduction in native forest harvesting and the need for structural adjustment in the hardwood harvest and haul industry. In general the hardwood harvest and haul industry in Tasmania needs to transition from one characterised by many smaller scale operators to one of fewer, larger scale operators. The increases in efficiency associated with such changes are also vital to the competitiveness of the potential processing developments outlined in this report.

Due to limited data and the limited scope of this study only indicative estimates can be provided for the impacts on the harvest and haul industry. While difficult to verify, it is generally accepted that the current hardwood harvest and haul industry in Tasmania, which harvests around 5.5 million tonnes pa, consists of around 120 businesses and currently employs around 1,000 people. With the increase in total hardwood harvest to around 8 million tonnes pa and assuming increases in the average size of harvest and haul operations, it was estimated that the number employed in hardwood harvest and haul operations in 2020 would be around 650 people. This suggests that the total number of people directly employed in hardwood harvest and haul operations in the future in Tasmania will reduce significantly. However, at the same time it was estimated that the total income generated by hardwood harvest and haul operations would increase from around $190 million pa to $240 million pa. The increased harvesting of softwood plantations is expected to generate additional income in excess of $4 million pa and around 16 jobs in the harvest and haul industry.

The development of domestic wood processing will also help facilitate ongoing investment in plantation re-establishment. While in the absence of domestic processing investments the plantation resources may find export markets, stable long term demand created by domestic processors will encourage re-investment in plantation resources as they are harvested. For example, it is estimated that replanting of plantations harvested in Tasmania would require ongoing investment of $25-30 million pa by 2020.

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Introduction

URS Forestry (URS) has prepared two reports for the Forests and Forest Industries Council (FFIC) on 'Markets and Market Prospects for the Forest Products Industry in Tasmania' (URS 2009a) and 'Global Climate Change and the Tasmanian Forest Products Sector' (URS 2009b). These reports identified a range of industry development opportunities for the Tasmanian forest industries. This report presents the results of an additional engagement by FFIC to estimate employment and income impacts for a range of potential investment opportunities identified in the previous reports.

The investments considered in this report represent the most attractive market opportunities identified previously by URS. The estimated employment and income impacts represent high level estimates of direct long term employment and gross income that would be generated by the investments. The analysis is based on resources that are forecast to be available in 2020. The investments considered specifically focus on new processing facility investments, and not structural adjustment of the existing industry, although implications for the existing industry are identified where they are considered to be significant. The investments outlined in the report are also provided on the basis that issues associated with the ability to process the future plantation sawlog resource viably are able to be resolved. The potential implications for the Tasmanian forestry harvest and haul sector are also considered.

The following development options were indentified as high priority in the previous studies and are considered in this report:

- Pulp production – development of a new hardwood kraft pulp mill;
- Engineered strand lumber – development of a 'Lignor' type mill;
- Hardwood sawn timber - new sawmills designed primarily to process plantation hardwood sawlogs;
- Plywood – expansion of current hardwood veneer production to plywood;
- Softwood sawn timber – additional softwood sawmilling capacity; and
- Bioenergy – development of a number of bioelectricity and wood pellet plants.

For each potential development the following impacts were assessed:

- Accessibility of a suitable quantity and quality of timber resource to sustainably supply the new facilities;
- Value of new investment in terms of capital expenditure;
- Long term employment generated in the new facilities once in full production; and
- Annual gross income generated by the new facilities once in full production.

The linkages that the new investments would have on the wider economy in terms of multiplier effects were also considered. In addition, implications of the changing forest resources and new investments on the harvest and haul industry were considered as well as implications for investment by forest growers.

This report aims to provide high level indicative estimates of economic impacts. Information has been drawn together from a range of sources, including publicly available estimates of the economic impacts of existing and proposed developments. Detailed economic modelling of the new processing investments on the Tasmanian economy has not been undertaken by URS. The estimates of future income generated by investments are based on prevailing product prices and expressed in current dollars. All values are expressed in Australian dollars unless specified.

The estimates of gross income presented in this report represent the value of output of each of the mills. As such they include values of all direct inputs to the processing operation e.g. the cost of logs,

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log transport, labour and other mill operating costs. The employment impacts identified for each new mill investment represent the number of people that would typically be employed directly in operating the mill. Economic multipliers[1] would substantially increase these impacts. Detailed economic modelling undertaken as part of the impact assessment for the proposed Tasmanian pulp mill provided an indication of the economic multipliers for a new pulp mill investment. Detailed modelling of the income and employment multipliers for the other investments has not be undertaken but as a guide it is common for an economic multiplier of around two to be applied to the forest industries (e.g. Dywer Leslie Pty 1995, MGP 1995, Felmingham 2002, URS Forestry 2003c).

The estimated impacts represent additional income and employment that would be generated from the new forest sector investments. However, there may be some structural adjustment associated with the new investments which would reduce their net impacts. In particular, the hardwood sawmilling sector is expected to undergo considerable structural change associated with increasing reliance on plantation resources and the construction of a hardwood pulp mill and an ESL mill would be expected to see some reduction in volumes of woodchip exports in favour of domestic processing. Where possible the indicative impacts of such net changes have been identified.

Section 2 of this report identifies available forest resources on which potential new developments could be based. Section 3 analyses the expected economic impacts of different investment opportunities and Section 4 presents an overall industry development scenario where the impacts of individual developments are combined to represent the state-wide economic impacts for Tasmania. It also provides an assessment of the implications of the industry development scenario on the harvest and haul industry and forest growers.

[1] An economic multiplier shows the flow on effects from one sector to the wider economy. They are estimated from input-output analyses that measure the relationships between different sectors.

2

Resource Availability

This section identifies the available forest resources in Tasmania on which potential new wood processing developments could be based.

Tasmania has extensive plantation and native forest resources under both public and private ownership. The URS (2009a) report provided an overview of the current state of Tasmania's forest resources available for timber production. Table 2-1 summarises estimated current and future harvest volumes of forest resources from different sources. Sawlog resources are reported in cubic metres, and pulpwood resources are reported in tonnes.

Table 2-1 Tasmania current and future forest resources

Resource category	Current harvest	Amount available in 2020
Hardwood pulpwood (tonnes)		
Plantation hardwood pulpwood	1,320,000	4,505,000
Native forest hardwood pulpwood - public land	2,454,000	1,815,000
Native forest pulpwood - private land	1,051,000	605,000
Hardwood sawlog chip residue	370,000	588,500
Total hardwood pulpwood and residues (tonnes)	5,195,000	7,513,500
Hardwood sawlogs and peeler logs (m^3)		
High quality plantation sawlogs - public land [(a)]	0	150,000
High quality native forest sawlogs - public land	300,000	150,000
Sub-total high quality sawlogs (public land)	300,000	300,000
Other quality plantation sawlogs and peelers - public land	0	330,000
Plantation sawlogs and peelers - private land [(b)]	0	50,000
Other quality native forest sawlogs and peelers - public land	320,000	330,000
Native forest sawlogs and peelers - private land [(b)]	50,000	60,000
Sub-total other quality sawlogs and peeler logs	370,000	770,000
Total all sawlogs and peeler logs (m^3)	670,000	1,070,000
Hardwood biomass – plantations and native forests (tonnes)	0	2,500,000
Softwood pulpwood (tonnes)		
Softwood pulpwood from all sources	506,000	371,000
Softwood sawlog chip residue	223,000	276,000
Total softwood pulpwood (tonnes)	729,000	647,000
Softwood sawlogs from all sources (m^3)	697,000	862,000
Softwood biomass (tonnes)	0	430,000

(a) Analysis of recoveries from plantation hardwood sawmills (Innes *et a*l 1980) suggests that these logs may be of lesser quality than native forest high quality sawlogs.

(b) Note private forest growers do not make the same distinction between high quality sawlogs and other quality sawlogs as does Forestry Tasmania which is required by legislation to supply at least

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300,000 m^3 pa of high quality sawlogs. Thus, some proportion of the private land sawlogs would include logs of similar quality to those defined as high quality sawlogs by Forestry Tasmania.

Source: URS Forestry, Forestry Tasmania and Private Forestry Tasmania estimates

Over the next decade there will be a substantial increase in available volumes of plantation hardwood pulpwood and sawlogs in Tasmania. The bulk of hardwood plantation establishment in Tasmania has occurred since the early 1990s. Establishment rates peaked in the period 2000-05 and this will result in significant growth in hardwood pulpwood production over the next decade, and hardwood sawlog production over the next two decades.

There will be a net increase in available volumes of hardwood pulpwood of around 2.3 million tonnes pa. It is intended that the increasing availability of plantation hardwood sawlogs will provide an alternative resource as available sawlog volumes from native forests decline. While the volume of plantation hardwood sawlogs and peeler logs will increase by more than 500,000 m^3 pa by 2020, it should be noted that new sawmill investments will be required to process these logs, and the viability of these investments will depend on the quality of plantation logs over which there is considerable uncertainty. It should be noted that an outcome whereby these logs prove to be unviable for production of dried sawn timber and are directed to other processing alternatives would generate considerable additional structural adjustment in the Tasmanian forest sector.

While the plantation softwood pulpwood volumes will decline, the availability of softwood sawlogs increases by around 165,000 m^3 pa.

The other notable characteristic in resource supply is the potential volumes of biomass that could be available. Biomass is the residue left in the plantation or forest after harvesting and removal of logs, and consists of tree tops, branches, bark and below specification trees. Biomass is not currently removed from Tasmania's plantations and native forests, but Table 2-1 shows that significant quantities are potentially available. It should be noted that these volumes are estimates based on general conversion factors of log to residue availability for hardwood and softwood plantations and native forests. Further work would be required to confirm the volumes of biomass that are likely to be available on a sustainable basis.

3

Industry Development Options

This section describes the expected economic impacts of a range of investment opportunities. The investment opportunities identified are based on those considered to have the greatest market opportunity in the previous analyses conducted by URS Forestry (URS 2009a and URS 2009b).

3.1 Hardwood pulp mill

There is a market opportunity to develop a new hardwood pulp mill for pulp export and potentially import replacement in Tasmania. A new pulp mill would see the large volumes of available hardwood pulpwood processed domestically, rather than exported as woodchips. Global demand and trade in pulp is growing, driven largely by increasing imports by China which is now the world's largest importer of pulp. Australia currently imports around one-quarter of the pulp it consumes.

Cost competitiveness represents a major challenge to pulp mill development in Australia. Pulp price movements, which can be considerable, reflect both supply and demand of pulp as well as wider economic conditions. Following significant increases over the last 5-10 years prices fell rapidly as a result of the global economic crisis. However, the most recent prices for internationally traded pulp have once again begun to increase.

Availability of resources

A kraft pulp mill will require 3.2 to 4 million tonnes of pulpwood pa to produce between 800,000 and 1.1 million air dry tonnes of pulp pa. The current availability of hardwood pulpwood is about 5.2 million tonnes pa, and this is forecast to increase to around 7.5 million tonnes by 2020. Virtually all hardwood pulpwood is currently exported as woodchip with modest quantities being utilised for paper production by Norske Skog at Boyer and Australian Paper at Wesley Vale as well as for other production purposes (e.g. garden mulch). As well as absorbing additional volumes which are becoming available from plantations, some of the volume of woodchips currently exported could be diverted to a new pulp mill. Such a mill could use a mixture of wood from native forests and hardwood plantations.

Capital value of new investment

Capital expenditure for a kraft pulp mill will be around $1.5 billion initially plus $10-20 million annually in additional capital investments (Stanford 2006).

Long term direct employment

A pulp mill would directly employ around 290 people during operation. It is estimated that around 60% of the ongoing operational jobs would require new training. The significance of a mill to the Tasmanian economy and the large component of local sourcing for the mill means that mill investment would also create a large number of jobs both up and down the product chain as well as indirectly. It has been estimated that a pulp mill investment will create around 1700 jobs in Tasmania in the long term (Stanford 2006).

Annual gross income

The annual direct income to be generated by a pulp mill is estimated by multiplying the volume of pulp produced by the product value. Assuming a long term average pulp price of $750 per bone dry metric tonne (bdmt), a new pulp mill would generate gross income of around $750 million when the mill is in

full production. It was estimated that the pulp mill would add around $6.7 billion to Tasmania's Gross State Product, or 2.5 per cent, to the Tasmanian economy over a 20 year period (Gunns 2006b).

3.2 Engineered strand lumber

Production of reconstituted wood products such as engineered strand lumber (ESL) provides an emerging market opportunity for utilising available hardwood pulpwood in Tasmania. ESL utilising eucalypt wood has been developed by an Australian company Lignor. This product has the opportunity to compete in markets for solid structural timbers, laminated veneer lumber (LVL) and in outdoor appearance uses (decking), as well as compete against some steel uses. Consumption of LVL in Australia has grown rapidly this decade and imports supply more than one-third of domestic demand. The commercial viability and competitiveness of an ESL mill in Australia is not yet proven. Lignor proposed a mill in WA but was unable to attract financing. However, similar products have been developed in the US which demonstrates growing market interest.

Availability of resources

A commercial scale ESL mill would require approximately 550,000 tonnes pa of pulpwood to produce around 240,000 m^3 pa of ESL. With increasing volumes of available plantation hardwood pulpwood becoming available over the next decade, sufficient resources would be available for a new ESL mill without the need to reduce current export volumes. However, the combination of a pulp mill and ESL mill would see some volumes of Tasmanian woodchips currently expected to be exported, diverted to domestic processing.

Value of new investment

Capital investment of a new ESL mill of the scale described above is estimated to be around $225 million.

Long term direct employment

An ESL mill of the scale described above would generate around 150 direct ongoing jobs once in full production.

Annual direct income

It is expected that production from an Australian mill would supply both domestic and export markets as the domestic market may not be sufficient to absorb the total volume of output. It is difficult to estimate market prices for eucalypt ESL as it is a new product. However, based on prevailing prices for the products with which eucalypt ESL would compete a price of around $1,200/$m^3$ is suggested. This equates to around $290 million of annual direct income.

3.3 Plantation hardwood sawmills

Availability of plantation hardwood sawlogs in Tasmania will increase substantially over the next two decades as sawlog plantations mature. Development of new plantation hardwood sawmills presents an opportunity to process these resources.

The market opportunity for hardwood sawn timber is driven by both international and domestic markets. Increasing scarcity of hardwood sawlogs globally as supplies from tropical forests decline,

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combined with growing demand in Asia, creates opportunities for hardwood sawn timber export to China and South East Asian countries. Declining supply from native forests in other Australian states presents the opportunity for Tasmania to increase its share of domestic hardwood sawn timber markets.

The domestic market opportunity for hardwood sawn timber suggests a focus on higher value appearance products, in particular flooring, joinery and mouldings, as hardwood sawn timber is unlikely to recapture share in the house framing market. Sawn timber export opportunities will focus on furniture production and a range of construction and higher value applications.

The shift from native forest to plantation hardwood resources will require extensive adaptation of the processing industry. New plantation hardwood sawmills will require specialised sawing technologies to process plantation logs. Ongoing research into processing systems is yielding positive outcomes for sawing. However, there is some risk and uncertainty associated with the quality of plantation hardwood sawlog resources. In particular, research by Innes *et al* (2008) has suggested that low recovery of high quality sawn timber largely due to internal checking during drying, particularly for plantation grown *E. nitens* sawlogs, is likely to make returns to sawmilling marginal or uneconomic. The researchers identified that further investigation of options for reducing internal checking should be a high priority.

New plantation sawmills will also need to be larger than existing mills to be cost competitive, and the opportunity exists to improve economies of scale compared to existing hardwood sawmills based on native forest resources. Achieving competitive costs of production will be particularly important to Tasmania's ability to compete in export markets.

Accessibility of a suitable quantity and quality of timber resource

The experience of plantation hardwood sawmilling overseas as well as experience in Australia points to an indicative scale for a competitive plantation hardwood sawmill utilising a traditional reciprocated[2] sawing system of around 50,000 to 80,000 m^3 pa log input on a multi-shift basis.

In recent years, the potential attractiveness of utilising linear[3] sawing systems for hardwood plantations has attracted attention. Washusen and Innes (2008) analysed the potential benefits of such a system and concluded that it is likely to provide greater economic returns than the traditional reciprocated system. However, a linear sawing system would require a log input of at least 250,000 m^3 pa. The average size of hardwood sawmills in Australia is less than 50,000 m^3 pa log input. There is currently only one hardwood sawmill in Tasmania with an input greater than 45,000 m^3 pa, 12 with an input of between 15,000 m^3 and 45,000 m^3 pa, 13 with an input of between 3,000 m^3 and 15,000 m^3 pa, and 46 hardwood sawmills have an input of less than 3,000 m^3 pa.

The forecast growth in availability of plantation hardwood sawlogs suggests there are opportunities to develop several new plantation hardwood sawmills in Tasmania. Supply of high quality hardwood sawlogs from plantations is forecast to increase from negligible levels at present to 150,000 m^3 pa by 2020. Supply of other quality hardwood sawlogs and peelers from plantations will increase by 380,000 m^3 pa over the same period.

[2] A reciprocated sawing system is one whereby the sawlog is placed on a carriage and passed by a fixed saw or saws to produce a single board. Multiple boards are produced by bringing the log back and passing by the saw again. This system is traditionally used in the native hardwood sawmilling industry in Australia. In more recent times the move to re-growth sawlogs has seen increased introduction of twin band saw reciprocated sawing systems that are also suitable for plantation grown wood.
[3] By contrast linear sawing systems pass logs through multi sawing/chipping centres that produce multiple boards from a single pass.

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The number of new sawmills that could be supported by the increased plantation resources will depend on the type of new sawmills constructed, the quality of the sawlogs, resolution of the extensive difficulties in seasoning the sawn product as well as structural adjustment in the native hardwood sawmilling industry. As noted above and in URS (2009a) there are a number concerns over the ability of Tasmanian hardwood plantations to produce sawlogs that are capable of providing recoveries of quality sawn timber sufficient to provide economic returns to sawmills.

Further, it is possible that some of the plantation hardwood sawlogs will be utilised by existing native forest sawmills to replace declining native forest resources, and there is also likely to be some rationalisation of existing hardwood sawmills associated with these changes. However, the still significant volumes of native forest sawlogs that will remain available suggest that there will continue to be scope for smaller, specialised native hardwood mills to continue operation focussing on high value appearance grade markets.

The combination of these factors makes it difficult to be precise on the number of new hardwood sawmills that are likely to be constructed. Based simply on the potential additional volume of logs available and assuming that all existing mills continue, the additional plantation resources could support around five new hardwood sawmills based on reciprocated systems or one new linear based system. These numbers could increase, perhaps up to more than ten new reciprocated sawmills or more than three new linear sawmills with rationalisation of the existing hardwood sawmilling industry. Alternatively, the number of new mills will be less if some proportion of the log mix is not capable of providing economic returns. The location of the native forest and plantation resources within the State will also be a key determinant of the number and location of sawmills.

In these circumstances, to illustrate the potential impacts of new hardwood sawmill investments it is assumed that over the next decade either three new hardwood sawmills utilising reciprocated sawing systems are constructed or, alternatively, one new linear based sawmill is constructed.

Value of new investment

A new plantation hardwood sawmill utilising a reciprocated sawing system with 80,000 m^3 pa log input would require capital expenditure of around $20 million. This includes costs of infrastructure, the sawline, drying systems and the drymill. Thus the construction of three new mills could be expected to generate capital expenditure of $60 million. Alternatively, the equivalent capital costs for a new hardwood sawmill utilising a linear based sawing system is likely to be around $65 million.

Long term direct employment

A plantation hardwood sawmill utilising a reciprocated sawing system with an input capacity of 80,000 m^3 pa would employ about 65 to 70 people at full production. Thus three sawmills would be expected to employ around 200 people. A single linear type sawmill would generate long term employment for 65 people.

Annual direct income

A plantation hardwood sawmill with a log input of 80,000 m^3 utilising a reciprocated system would produce around 25,000 m^3 pa of dried sawn timber. The annual direct income to be generated by a plantation hardwood sawmill will depend on the relative volumes of different grades of timber produced. Using an average selling price of $650 per m^3 suggests an annual income for each sawmill of around $16 million. Thus three of these sawmills could be expected to generate annual income of

around $50 million. A single linear sawmill with an input of 250,000 m^3 pa could be expected to produce an output of around 75,000–80,000 m^3 pa of sawn timber which would produce an annual income of around $50 million.

3.4 Hardwood plywood

The development of the new Ta Ann rotary veneer mills at Huon and Smithton has resulted in a reduction in log exports from Tasmania and an increase in the level of domestic value adding. The Ta Ann mills will produce 145,000 m^3 pa of hardwood veneer, which is currently all destined for export.

Limited domestic production of hardwood plywood and declining domestic resources, as well as limited declining supplies from tropical forests internationally, creates market opportunities for further processing the hardwood veneer currently produced in Tasmania into plywood. Expanding the new rotary veneer mills to plywood production to service domestic and export markets would present less risk than constructing a new green field hardwood plywood mill. The challenge for a new hardwood plywood mill in Tasmania will be to achieve international scale and cost competitiveness.

Availability of resources

Additional forest resources are not required for a hardwood plywood development as it would further process the hardwood veneer produced in the Ta Ann mills.

Value of new investment

The Ta Ann veneer mills cost $75 million to build. Production of plywood would require the installation of a layout press machine. It is assumed that there is sufficient existing infrastructure (buildings, electricity etc) in the veneer mills to house plywood production. It is also assumed that all plywood would be produced at one of the veneer mills, so only one layout press would be purchased. The cost of a layout press depends on the level of automation and technology required. URS estimates that investment in the order of $15 to $20 million would be required.

Long term direct employment

The veneer mills directly employ around 135 people. The level of employment generated through plywood production would depend on the level of machine automation. It is estimated that plywood production would require an additional 50 people.

Annual direct income

The annual direct income to be generated by plywood production is estimated by multiplying the volume of plywood produced by the product value. URS estimates that around 100,000 to 110,000 m^3 pa of plywood would be produced from 145,000 m^3 veneer. An indicative average free on board price for Malaysian and Indonesian plywood is about $530 per m^3. Therefore, plywood production and export would generate annual income of around $55 million pa. According to Ta Ann, the export of the veneer produced in the mills will generate an annual income of $35 million pa. Therefore, further value adding through the production of plywood could increase annual income by around $20 million pa.

3.5 Softwood sawmilling

Tasmania is one of few regions in Australia where there will be an increase in softwood sawlog availability over the next 10 years. The opportunity exists for growth in softwood sawn timber production to supply domestic and international markets.

Accessibility of a suitable quantity and quality of timber resource

Softwood sawmills in Australia that are internationally competitive commonly have an input of at least 600,000 m^3 pa of softwood sawlogs. Softwood sawmills designed to produce niche products may be smaller scale but are still likely to require input of greater than 250,000 m^3 pa to be competitive. The future increase in softwood sawlog availability in Tasmania of around 165,000 m^3 pa suggests that one of the two existing larger scale sawmills could have the capacity to process this additional sawlog volume. Investment in softwood sawn timber developments is therefore likely to focus on expansion and increased production of existing sawmills.

Value of new investment

While not having detailed knowledge of the capital equipment at each sawmill site, it is expected that the additional volume of 165,000 m^3 pa could be processed by the existing sawmills without major additional capital expenditure – probably less than $10 million.

Long term direct employment

It is expected processing additional volumes would require additional employment of around 30 people based on pro-rata of employment in typical large scale softwood sawmill.

Annual direct income

Based on an average selling price for a softwood sawmill of $400 per m^3 sawn timber, and assuming a recovery of 42%, suggests the estimated value of the additional output would be around $28 million pa.

3.6 Bioenergy

There is an opportunity to use forest biomass resources in Tasmania for the production of bioenergy. The introduction of a carbon price and renewable energy targets, both domestically and internationally, has resulted in the rapid development of bioenergy markets. There are several bioenergy proposals in Australia, including a new large scale wood pellet export plant which was recently commissioned by Plantation Energy in Western Australia and a number of coal fired power stations have utilised co-firing of wood.

The combination of a carbon price and technological developments present a range of longer term opportunities for utilising wood biomass in uses such as biochar, biofuels and industrial carbon. Australia's renewable energy target of 20% will require production of around 45,000 GWh from renewable sources. A 30 MW power plant produces around 260 GWh so this suggests that depending on relative competitiveness with other renewable energies, there is considerable scope for the development of biomass based electricity generation across Australia, including Tasmania.

It is expected that the most significant opportunities in Tasmania over the next decade will be in the form of bioelectricity power plants and production of wood pellets for export. Power produced from

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Tasmanian bioelectricity plants could be either sold within the state or supplied to the national grid and the production of wood pellets could be for domestic use or export, particularly to Europe where demand is high.

There are sufficient additional volumes of biomass available to support a number these types of plants. However, it is not possible to determine precisely how many plants will be constructed and in which combination that may occur. This will depend on factors such as cost of the resource, harvesting and transport economics and development of domestic and international bioenergy markets.

For the purposes of illustrating the potential income and employment impacts of bioenergy investments, it is assumed that around 60% of the available resource is utilised by new investments over the next decade, and that these consist of three 30 MW bioelectricity plants and one export oriented wood pellet plant. A 30 MW power plant will provide electricity for around 12,000 houses.

Availability of resources

Recent bioelectricity proposals in Australia range in size from 20 MW to 40 MW. Approximately 10,000 tonnes of biomass is required to produce 1 MW of electricity. Therefore, a 30 MW power plant would require about 300,000 tonnes pa of biomass.

The minimum scale for a commercially viable wood pellet mill is 20,000 tonnes pa output, although the new mill in WA is much larger than this with a target output of 250,000 tonnes pa. Approximately 1.8 to 2 tonnes of biomass is required to produce 1 tonne of pellets. This assumes pellet moisture content of 10% and minimal fibre loss during pellet manufacture. It is assumed that an export oriented plant in Tasmania would be a similar size to the proposed WA plant which would require around 500,000 tonnes of wood biomass to produce around 250,000 tonnes of pellets. Thus the combination of three bioelectricity plants and one pellet plant utilises around 50% of the estimated available biomass resource in Tasmania.

Value of new investment

The capital expenditure for a new bioelectricity power plant or wood pellet plant depends on the scale of the facility. There are significant differences in the capital costs for small and large bioelectricity power plants. A large bioelectricity plant of 40 MW or more may cost $2.5 million per MW of installed capacity. However a smaller plant of, say 1 MW capacity, may cost more than $8 million per MW. Pacific Energy proposes to build a 30 MW plant in WA that will involve capital investment of $115 million. Using this as a basis three 30 MW plants in Tasmania would require a total capital investment of around $345 million.

The Plantation Energy pellet plant in WA is used as the basis for the indicative investment value in Tasmania. The WA plant required a capital investment of $25 million for a production capacity of 250,000 tonnes pa.

Long term direct employment

The employment generated by new bioenergy facilities is also dependent on plant scale. The proposed Pacific Energy 30MW bioelectricity power plant would directly employ around 50 people when operational and the Plantation Energy pellet plant will employ around 15 people.

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Thus it could be expected that the three bioelectricity plants in Tasmania will generate around 150 jobs and the pellet plant will employ around 15 people.

Annual direct income

A bioelectricity plant will generate income from sales of electricity as well as sales of Renewable Energy Certificates (RECs) under the Commonwealth Government's renewable energy scheme. With the expansion of the renewable energy target and the CPRS, prices for electricity are forecast to increase and prices for RECs decline over time. To estimate income from the bioelectricity plant forecast prices for electricity and RECs presented in a report by MMA (2009) were used. The report provided a weighted average price for electricity and RECs from a bioelectricity plant of $118/MWh. Based on this price, the three bioelectricity plants would generate annual income of around $95 million.

In order to calculate the income generated by export pellet sales it is necessary to calculate the free on board product value. Pellet prices in Europe range widely between countries from €100 to €200 per tonne (Enecon 2007 and Roberts 2008). This equates to around $A175 to $350 per tonne at current exchange rates. This range of prices largely reflects price differentiation between pellets used in industrial processes and those for domestic energy consumption (retail uses). Retail pellet prices are at the higher end of this range, while industrial prices are at the lower end. Cost of transport to the port, port costs and shipping costs are estimated to be around $140 per tonne. Assuming a pellet price of $240 per tonne (in the lower half of the industrial/retail price spread), this equates to a free on board price of $100 per tonne. A pellet plant exporting 250,000 tonnes pa would therefore generate annual income of $25 million. This is an estimate only as prices are influenced by pellet prices and shipping costs which vary between countries and fluctuate.

4

Industry Development Scenario

This section provides an overview of the combined impacts of the potential industry development options outlined for the Tasmanian forest industries over the next decade. The possible multiplier effects of the new investments which occur through linkages between the forest industry and other sectors of the economy are also considered. Some implications of forecast changes in the sector for the harvest and haul industry and forest growers are also outlined.

4.1 Direct impacts of new investments

The combination of available resources and identified market opportunities for the Tasmanian forest industry suggest that there are considerable opportunities for new investment. If all of the opportunities identified in this analysis were implemented they would directly generate new capital investment of more than $2 billion, annual gross income of more than $1.2 billion and around 800 jobs in the new mills. Table 4-1 summarises the direct economic impacts from each of the new investments. These impacts on the Tasmanian and Australian economies would be considerably extended by the effect of economic multipliers with total impacts expected to generate around 2,700 jobs and income of more than $2 billion pa.

Table 4-1 Summary of income and employment impacts of new investments

Facility	Capital investment	Annual direct income	Long term employment in new mills
	($ million)	($ million)	(number of jobs)
Hardwood pulp mill	1,450	750	290
ESL plant	225	290	150
Hardwood sawmilling - 3 reciprocated mills	60	50	200
Hardwood sawmilling - 1 linear mill	65	50	65
Hardwood plywood [(a)]	15	20	50
Softwood sawmilling	10	30	30
Bioenergy – (based on indicative 3 bioelectricity plants and one export wood pellet plant)	370	120	165
Total (reciprocated hardwood sawmills option)	**2,130**	**1,260**	**885**
Total (linear hardwood sawmill option)	**2,135**	**1,260**	**750**

(a) Hardwood plywood production based on utilising output from existing veneer mills. Input volume represents log input to exiting veneer mills. Income and employment represent additional impacts compared to veneer production.

Source: URS estimates, Gunns (2006a), Gunns (2006b), Stanford (2006)

It should be noted that as well as absorbing additional volumes coming on stream from plantations, the construction of a new hardwood pulp mill as well as an ESL plant would result in some woodchips that are currently exported being redirected to domestic processing. A hardwood pulp mill and ESL mill combined would require around 4.6 million tonnes of resource. With hardwood pulpwood availability in Tasmania increasing by around 2.3 million tonnes pa by 2020, this implies that if both these investments were to proceed around 2.3 million tonnes of woodchips currently exported would be redirected to local processing. While this would result in a reduction of export income of around $240 million pa, it would generate direct income from domestic processing of around $950 million pa i.e. a net increase of $710 million. Similarly in the scenario outlined, hardwood plywood production would result in a net increase in income of around $20 million pa, and structural adjustment in the

hardwood sawmilling industry could be expected to lead to closure of some existing native forest sawmill but would also result in additional new sawmilling investments.

4.2 Linkage and multiplier effects

In addition to the income and employment generated directly by the new processing mills outlined in this study, income and employment are also directly generated through linkages both up and down the product chain e.g. in harvest and haulage, further processing, transport and associated services, as well as indirectly though economic multiplier effects. The values of the direct linkages are included in the estimates of income generated by each processing facility as they include the values of all inputs in the production process. The investments would also create considerable indirect income and employment through economic multiplier effects.

These total economic impacts have not been estimated for each of the potential mill investments as part of this report. However, economic modelling undertaken as part of the impact assessment of the proposed Tasmanian pulp mill provides an illustration of the potential size of these impacts. While the pulp mill would employ around 290 people in operating the mill, it is estimated that around 1700 jobs would be created though direct and indirect employment effects (Stanford 2006). This total number of jobs includes direct and indirect employment. While the mill would directly employ an estimated 290 people, it would also generate direct employment both up and down the supply chain. For example, by supporting the harvesting of up to 4 million tonnes of pulpwood per annum a pulp mill would generate significant jobs in forest management, harvesting and haulage. Further, the extensive links to the local economy that large processing operations such as a pulp mill have suggest that income and employment multipliers are likely to be higher than for other types of processing operations.

Employment and income multipliers for the other investments were based on an indicative average multiplier of two which is commonly used for the forest industry in Australia. On this basis it could be expected that the other investments would generate at least another 1000 jobs and around $1 billion in direct and indirect income. This is a conservative estimate for jobs as the employment multiplier is applied only to jobs in the processing operations and not other direct jobs up and down the supply chain. Thus all of the investments including the pulp mill could be expected to generate more than 2,700 jobs and annual income of more than $2 billion pa.

The impacts outlined above refer to income and employment generated from the ongoing operation of the new mills. While not estimated as part of this study it should also be noted that there would be considerable income and employment generated during the construction phases of these new processing facilities. These impacts can be significant for major capital investments. For instance, it is estimated that at peak construction time the proposed Tasmanian pulp mill would generate 2,500 jobs (Gunns 2006b), and investment in Tasmania during that time would be more than $1 billion (or 20% higher) than it would be in absence of the pulp mill project (Stanford 2006).

Economic multiplier benefits occur as a result linkages between the forest sector and other sectors of the economy. To illustrate the nature of these linkages, the following outlines some examples of the types of economic linkages that would likely be generated from the identified investments:

- **Engineering services** – the development of the types of mills identified would generate significant work for engineering services. These would typically include electrical, mechanical, civil and structural services required in design and construction of the mills as well as ongoing operation of the mills e.g. it is common for engineering services for mill maintenance to be contracted to

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specialist engineering services firms, and project engineering services in the construction phase of a project commonly represent 2-5% of the value of the capital investment.

- **Computer services** – all of the proposed mills would require substantial support for computer systems incorporated into the production process. These services would also include computer systems for stock movements, sales and marketing as well as accounting. These systems are commonly supported by local computer specialists.
- **Accounting and administration services** – all of these developments would create considerable demand for local accounting and administration services e.g. this would likely include provision of external accounting services including audit activities, and support for administration systems in the mills including implementation and audit of Australian standards.
- **Financial services** – the development and operation of the new investments would employ financial service providers in both providing initial capital financing as well as ongoing provision of finance for existing and new equipment. It is likely that the larger mills could have dedicated locally based financial managers;
- **Transport** – the mills would generate large demands for transport services including for inputs (in addition to log transport) as well as for outputs. For example, Gunns estimated that its proposed Tasmanian pulp mill could generate road freight output of around $15 million pa. There will also be additional need for services delivering road maintenance and upgrade.
- **Training services** – employees at the new mills will require significant amounts of training which in many cases is likely to be supported by TAFE and other training institutions as well as private training providers.
- **Accommodation and housing** – all mills will generate additional business for the local accommodation industry as a result of visitors to the mill. Similarly, some proportion of new workers employed at the mills will require new housing to be constructed.
- **Utility supply** – all of the mills require significant supplies from local utility suppliers including electricity, gas and water. For example, water will be required for operation of kilns in hardwood sawmills and treatment of softwood sawn timber, and large quantities of water are required for the pulp mill. It has been estimated that water supply and effluent disposal expenditures for the proposed Tasmanian pulp mill will amount to $3.6 million pa over the life of the mill.
- **Environmental services** – the construction and ongoing operation of the mills typically require provision of environmental assessment and monitoring services. These services are commonly contracted out to specialist providers.
- **Chemicals (including glues)** – many of the mills will require significant supplies of chemicals and glues. For example softwood sawmills use treatment chemicals and the plywood and ESL mills will require supplies of resins. It is estimated that Tasmanian basic chemical industries will grow by $8 million by 2030 as a result of the proposed Tasmanian pulp mill.
- **Mechanical services** – the mobile plant incorporated into all the mills such as loaders, fork lifts and company cars will generate additional work for local mechanical service suppliers. For example, the harvesting of biomass will require servicing and supply of machines for chipping or grinding forest residue.
- **Labour services** – the mills are likely to use the services of labour supply companies to source skilled workers.
- **Community services** – where rural populations increase as a result of new developments, there is potential to attract or retain investment in community services, such as schooling, health services and community activities such as sporting facilities.

4.3 Implications for the harvest and haul industry

While the increase in resources available for harvesting will provide opportunities for the harvest and haul industry in Tasmania, the decline in native forest harvest volumes combined with the existing structure of the industry means that the changes will require considerable adjustment, particularly for that part of the industry involved in native forest harvesting. In common with the hardwood processing sector the hardwood harvest and haul sector will need to undergo significant structural adjustment over the next decade if businesses are to remain viable.

Issues faced by the existing harvest and haul industry are well documented (URS 2007, Poyry 2007 and IndustryEdge 2008). In general the structure of the native forest harvesting industry is typified by a large number of relatively small scale operators. Analysis of the viability of native forest harvest and haul contractors makes it clear that many smaller scale operators struggle to maintain viability (URS 2007, Poyry 2007). The need for structural change to fewer, larger harvest and haul operators has been recognised by the Tasmanian Forest Contractors Association (TFCA) who has sought government assistance for structural adjustment. Some assistance for new investment was provided under the Tasmanian Community Forestry Agreement (TCFA) but this was not able to be utilised for structural adjustment, so to date has not resulted in significant structural change. The TFCA has called for further funding to facilitate such adjustment.

It is beyond the scope of this study to predict detailed structural changes amongst existing native forest harvest and haul contractors. However, it is clear that the reduction in native forest harvest volumes combined with the need for structural adjustment will reduce the net impact of increased harvesting of hardwood plantation resources. However, it should also be noted that the associated increases in efficiency are vital to the future competitiveness of the forest product processing industry in Tasmania.

Due to limited data available and the limited scope of this study only indicative estimates can be provided for the impacts on the harvest and haul industry. While difficult to verify, it is generally accepted that the current hardwood harvest and haul industry in Tasmania which harvests about 5.5 million tonnes pa consists of around 120 businesses. This suggests that on average each business harvests around 46,000 tonnes pa, however, the smaller operators typically produce around 30,000 tonnes pa. Based on an average of around 8-10 people in each native contracting business, it is expected that the hardwood harvest and haul industry currently employs around 1,000 people. This is consistent with figures reported in a recent study of employment and expenditure of the Tasmanian forest industry, which estimated that 1,020 people were employed in harvest and haul operations in 2005/06 (Schirmer 2008).

With the increase in total hardwood harvest to around 8 million tonnes pa and assuming that the average harvest volume for a contracting operation was around 100,000 tonnes pa, and that each operation employed around 8 people, it could be expected that the number employed in hardwood harvest and haul operations in 2020 would be around 650 people. This suggests that the total number of people directly employed in hardwood harvest and haul operations in the future in Tasmania will reduce significantly, perhaps by up to half. On the other hand, structural change in the harvest and haulage industry would require considerable new investment.

On the basis of increased efficiencies it could be expected that current hardwood harvest and haulage costs would decrease. Current average harvest and haulage costs for hardwood forests in Tasmania indicatively of around $35 per tonne could be expected to decline with structural adjustment and new investment. On the basis of plantation harvesting operations in other parts of Australia an indicative

average cost in Tasmania of around $30 per tonne could be expected. Using these costs the total income generated by hardwood harvest and haul operations would increase from around $190 million pa to $240 million.

The softwood plantation sector is already characterised by fewer, larger scale operators and therefore is not facing the same structural adjustment issues as the hardwood sector. The projected increase in softwood sawlog availability of around 165,000 m^3 pa by 2020 suggests that there may be room for an additional contractor or an equivalent increase in activities of existing contractors. Based on a typical softwood plantation harvesting operation producing around 100,000 – 120,000 m^3 pa directly employing around 12 people, the additional volume of softwood sawlogs could expected to generate around an additional 16 jobs. And based on harvest and haul cost of $25/$m^3$ additional harvesting operations could be expected to generate income in excess of $4 million pa.

4.4 Implications for forest growers

The potential industry developments outlined in this report would benefit forest growers by providing markets for the additional volumes of hardwood and softwood sawlogs and hardwood pulpwood coming on stream in Tasmania over the next 10 years. In general, these markets would provide increased income for growers from the additional sales volumes. The value of this income is not estimated separately as it is included in the income estimated to be generated by each mill.

The new processing investments would also encourage ongoing reinvestment in plantations which in turn generates income and employment. Actual areas to be harvested and replanted in any year will depend on yields from existing plantations and prevailing market conditions, however to demonstrate the significant impact of ongoing investment in re-establishment of plantations it is estimated that around 20,000 to 25,000 ha pa of plantations would be harvested in 2020 and beyond. This suggests that replanting would generate annual investment each year of around $25-30 million each year.

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Limitations

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