

The Allen Consulting Group

The Bell Bay Pulp Mill

Economic Impact Assessment Report

May 2006

Report to Gunns Limited

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Chapter 8

Potential Economic Impacts

8.1 Summary of Key Results

After many years of low growth relative to the mainland States, partly due to a lower level of investment, the Tasmanian community on average has lower incomes than those enjoyed in the rest of Australia. While Tasmania's economic performance has improved in recent years, this improvement will need to be further grown if the relative living standards of the State are to be enhanced and on par with its mainland counterparts.

The proposal by Gunns Limited (Gunns) to develop a bleached Kraft pulp mill within the Bell Bay Industrial Estate would constitute the largest ever investment by the private sector in Tasmania. The establishment of the proposed mill has been recognised by the Government of Tasmania as a Project of State Significance (POSS). This assessment of the economic significance of the proposed mill has been prepared as part of an Integrated Impact Statement (IIS) required by the Tasmanian Resource Planning and Development Commission (RPDC).

At around \$1.45 billion in capital expenditure, the proposed pulp mill would represent a significant opportunity for the State's economy to grow through value-adding, in a sustainable way, to one of its most valuable natural resources. By converting exports of woodchips into exports of pulp, the project offers the prospect of playing a catalytic role in moving the Tasmanian economy up the value chain. As this chapter demonstrates, significant economic benefits would accrue to the State's community.

This report contains significant analysis of the likely direct and indirect economic impact of the pulp mill. As the mill would have a pervasive economic impact on many businesses throughout the Tasmanian economy, its aggregate effects can only be estimated using complex computable general equilibrium modelling. The model used for this analysis was the MMRF-Green model, operated by the Centre of Policy Studies at Monash University. The MMRF-Green model is the most comprehensive economic model available in Australia and is highly regarded in terms of the robustness of its assumptions and the overall credibility of its results.

The key economic impacts of the proposed pulp mill at Bell Bay, as modelled by the MMRF-Green model, are summarised in Table 8.1. Several important assumptions underpin these results:

- **The results presented in Section 8.6 are based on computable general equilibrium modelling using the MMRF-Green model at the Centre of Policy Studies.**
- **All results are presented relative to a base case where no new pulp mill investment is made.**
- **All impacts, except employment, are in constant (\$2005) prices.**

- Although the mill is expected to have an operational life of 30 years, from 2007-2039, economic modelling results were not projected past 2030 due to concerns for increasing uncertainty of outcomes over long time frames.
- All NPV¹ calculations are taken over the 2007-2030 period, discounted at a real social discount rate of five per cent.²
- Construction phase employment impacts are presented as average annual increases over the construction phase, which is assumed to occur from 2007-2009.
- Operational phase employment impacts are presented as average annual increases over operational life of the mill, which is assumed to occur from 2009-2030.

Table 8.1

SUMMARY OF KEY ECONOMIC IMPACTS

Measure	Impact of Bell Bay mill (2007-2030) ^a	Percentage growth above base case projections in 2030
NPV ^b of Gross Domestic (State) Product impacts (\$billion) ^c		
Australia	\$3.8 billion	+0.03%
Tasmania	\$6.7 billion	+2.5%
NPV of investment impacts (\$billion)		
Australia	\$2.3 billion	+0.02%
Tasmania	\$3.1 billion	+2.2%
NPV of consumption impacts (\$billion)		
Australia	\$2.7 billion	+0.04%
Tasmania	\$3.3 billion	+2.6%
<u>Average</u> annual construction phase employment impacts ^d		
Australia	+696 persons	-
Tasmania	+2,187 persons	-
<u>Average</u> annual operating phase employment impacts ^e		
Australia	+284 persons	0.0%
Tasmania	+1,617 persons	+2.0% ^g

Note ^a: All results are presented relative to a base case where no new pulp mill investment is made. Note ^b All NPV calculations are taken over the 2007-2030 period, discounted at a real social discount rate of five per cent. Note ^c: All impacts, except employment, are in constant (\$2005) prices. Note ^d: Construction phase employment impacts are presented as average annual increases over 2007-2009. Note ^e: Operational phase employment impacts are presented as average annual increases over operational life

¹ The Net Present Value, or NPV, of an investment or stream of cash flows quantifies the present value of future revenues and expected costs associated with the investment. This is premised on the concept of the 'time value of money': generally cash is worth less tomorrow than it is today. To determine the present value of a project or investment, future cash outlays or revenues are discounted back at a social discount rate of five per cent. Discounting cash flows enables decision makers to compare different investments on a like-for-like (present value) basis.

² The selection of the social discount rate (five per cent) was based on the assessment that the returns would be expected to occur if the mill were to be constructed, making the notional rate of 'risk free' government bonds the appropriate 'next best alternative' investment. This reflects the opportunity cost of capital. The use of the government bond rate is the accepted rate for economic impact assessments.

of the mill (2009-2030). Note ¹: The mill will have an operational life of 30 years (2007-2039). Financial modelling was conducted by Jaakko Pöyry ³ separate to the preparation of this chapter. The results presented in Section 8.6 are based on computable general equilibrium modelling (which is based on the financial projections but separate from their development). The economic modelling results were not projected past 2030 due to concerns for increasing uncertainty of outcomes over long time frames. Note ²: Note that this is an increase in the time that persons are employed, which is slightly different to the number of persons employed. The MMRF-Green model assumes that employed persons become more productive. In 2030 employment (hours worked) increases relative to its base case level by 2.0 per cent. In 2030 the number of persons employed in Tasmania (persons employed includes full and part-time workers as defined by the ABS for its labour survey) in the base case is 286 thousand. In 2030 employment (persons employed) increases relative to its base case level by 2,020 persons (this is equivalent to 0.7 per cent of base case employment in persons). Thus the increase in hours worked has been met by a combination of a 0.7 per cent increase in the number of full and part-time jobs and a 1.3 per cent increase in the number of hours worked per person employed.

Overall, the modelling shows that the proposed pulp mill would yield substantial positive benefits to Tasmania and Australia in the form of greater economic activity and employment. Tasmania's gross State product (GSP, or the State equivalent of GDP) would be \$6.7 billion higher than otherwise in net present value (NPV_{5%})⁴ terms from 2007 to 2030. Approximately 1,617 additional jobs would be sustained on average during the operating phase of the project. As discussed in Section 8.6 below, the employment impacts are particularly significant given the labour market assumptions contained in the economic model, which assume that wages will over time adjust such that long run employment rates are sustained.⁵

During the operating phase there are substantial investment, production and employment impacts. The major factors driving these economic impacts outlined in Table 8.1 are:

- the net increase in exports generated by the mill — that is, the increase in the value of exported pulp relative to the value of the woodchip exports that the pulp exports have replaced;
- the flow-on industry growth generated by the sustained increase in demand for Tasmanian goods and services;
- the replacement of pulp imports with pulp produced domestically at the Bell Bay mill; and
- the sale of surplus power and renewable energy certificates (RECs) provided by biomass electricity generation at the mill.

There are also additional impacts during the construction phase driven by increased investment, production and employment activity. The full impact of all of these factors incorporates both the direct and indirect — or secondary — stimulatory impacts on major economic indicators.

³ Jaakko Pöyry is a consulting firm that provides engineering and project implementation services. It specialises in the forestry and pulp and paper industries.

⁴ The Net Present Value, or NPV, of an investment or stream of cash flows quantifies the present value of future revenues and expected costs associated with the investment. This is premised on the concept of the 'time value of money': generally cash is worth less tomorrow than it is today. To determine the present value of a project or investment, future cash outlays or revenues are discounted back at a social discount rate of five per cent. Discounting cash flows enables decision makers to compare different investments on a like-for-like (present value) basis. The selection of this rate (five per cent) was based on the assessment that the returns would be expected to occur if the mill were to be constructed, making the notional rate of 'risk free' government bonds the appropriate 'next best alternative' investment. This reflects the opportunity cost of capital.

⁵ This is consistent with the NAIRU concept. The term NAIRU is an acronym for Non-Accelerating Inflation Rate of Unemployment, sometimes referred to as the long run 'natural rate of unemployment'. At this level it is assumed that the economy is at 'full employment'. It is assumed that if actual unemployment falls below the NAIRU, the inflation rate is likely to rise quickly (accelerate).

As would be expected, particularly for a relatively small State such as Tasmania, the economic impacts of the mill are far more pronounced at the State level than the national level. The pulp mill essentially draws resources — capital and labour — away from the mainland Australian economy and towards Tasmania. This means that while economic outcomes in Tasmania are better than they would otherwise have been, this may be at the expense of economic outcomes in other States and Territories. Nevertheless, the overall net impact of the pulp mill on the national economy is generally positive — the Australian economy as a whole is better off as a result of the development. Related to this, the stimulus to the national economy generated by the pulp mill is markedly less than the stimulus to Tasmania. This is because the new net exports of pulp generated by the mill ‘crowd out’ other export and import-competing sectors. This occurs as the real exchange rate strengthens in response to the increase in net exports, thus reducing the competitiveness of Australia’s other traded commodities.

In analysing the economic impact of the proposed mill, this Chapter:

- briefly examines the policy context for new investments in the Tasmanian wood and forest products industry (Section 8.2);
- presents key statistics of the Tasmanian economy, including the Bell Bay and Northern Tasmanian economies, and identifies economic development policy goals for the state (Section 8.3);
- describes key features of the Bell Bay Pulp mill, including capital and operating expenditure requirements, energy sector impacts, shares of inputs sourced from Tasmania, the relationship of the mill to other businesses Tasmania, and the new technologies that would be introduced (Section 8.4);
- outlines the methodology for estimating the social and economic benefits to Tasmania and Australia from the mill, including quantitative analysis conducted using computable general equilibrium modelling, and qualitative analysis conducted through stakeholder consultations (Section 8.5);
- analyses the economic and social impacts, primarily as estimated using the MMRF-Green economic model that has been developed and operated by the Centre of Policy Studies (CoPS) at Monash University and complemented by stakeholder consultation (Section 8.6).

The total economic impact of the mill is evaluated, including its potential to lift Tasmania’s economic performance. Several appendices accompany this report. Appendix A details the persons consulted for the preparation of this report. Appendix B provides technical information about the MMRF-Green model used to estimate the wider economic benefits of the project in Australia and Tasmania. Appendix C provides all MMRF-Green data, including results that are not discussed at length in this chapter.

8.2 Policy context for forestry and wood product investments

The Tasmanian government’s overall policy framework, which has been developed since the early 1990s, provides a supportive foundation for the development of the proposed pulp mill. Tasmania’s forestry sector has developed strongly in response to a number of key government and industry initiatives. These include:

- a considerable increase in the area allocated for plantation forestry;

- forest management in accordance with international practices⁶ for sustainable forestry and a strong program of certification which recognises best practice and continuous improvement in forest management (ISO 14001; AFS, PEFC);
- investment in more sophisticated processes so as to shift the industry away from simple logging to value-adding manufacturing;
- increases in the exports of chips and sawn wood and paper products; and
- State government encouragement for industry to invest in value-adding in pulp production.

After lengthy negotiations, a Regional Forestry Agreement (RFA) was concluded between the Commonwealth and Tasmanian governments in 1997. The objective of the RFA was to ensure the conservation of Tasmania's ecologically significant forests while providing the basis for a sustainable forestry industry that would be able to benefit from an increased level of resource security. Together with the RFA, the Tasmanian Community Forest Agreement,⁷ ratified in May 2005, has provided the institutional and policy framework within which the proposed pulp mill project has been formulated. An important objective of the agreement was to foster vertical integration in forestry operations and enhanced levels of downstream processing and value-adding within the envelope of an ecologically sustainable forestry industry. The proposed pulp mill is consistent with and brings to realisation this objective of the RFA via downstream processing and value-adding Tasmania's pulpwood resource.

Tasmania also has a long-term strategy for economic growth, *Tasmania Together 2020*. This policy is briefly discussed in Section 8.3.

8.3 Tasmania's historical economic performance

Before examining the projected economic impact of the proposed pulp mill, it is useful to undertake a brief review of Tasmania's recent economic performance.

Comparing Tasmania to Australia — key statistics and trends

For many years, Tasmania's rate of economic growth has lagged behind the national average. Over the decade from June 1996 to June 2005, the average annual rate of growth of Gross State Product (GSP) in Tasmania was 2.1 per cent.⁸ By comparison, Australia's national average rate of growth of GDP over the same period was nearly twice as great, at 3.7 per cent.⁹ Since 2001-02, however,

⁶ Gunns Limited was the first Australian forestry company to be ISO 14001 certified (1998), and the first to achieve certification under the Australian Forestry Standards (2003). The AFS was mutually recognised under the international certification framework PEFC (Programme for the Endorsement of Forest Certification Schemes) in 2004.

⁷ The Prime Minister, the Hon John Howard MP and the Premier of Tasmania, the Hon Paul Lennon, MHA jointly announced the Tasmanian Community Forest Agreement on 13 May 2005. The Tasmanian Community Forest Agreement is a joint commitment of the Australian and Tasmanian Governments to enhanced protection of Tasmania's forest environment and growth in the Tasmanian forest industry and forestry jobs. The Governments are committing over \$250 million to revitalise the timber industry and preserve old-growth forests. In addition to specific environmental protections for Tasmanian forests, the Community Forest Agreement, implemented through a supplement to the Tasmanian RFA, also provides a series of grant assistance programs. The aims of these programs are to help the industry become more efficient, produce higher value forestry products, and improve the skills of forestry workers. More information can be sourced from the Department of Agriculture, Fisheries and Forestry.

⁸ ABS, 2006, Cat. No. 5220.0, Gross State Product, Chain volume measures(a).

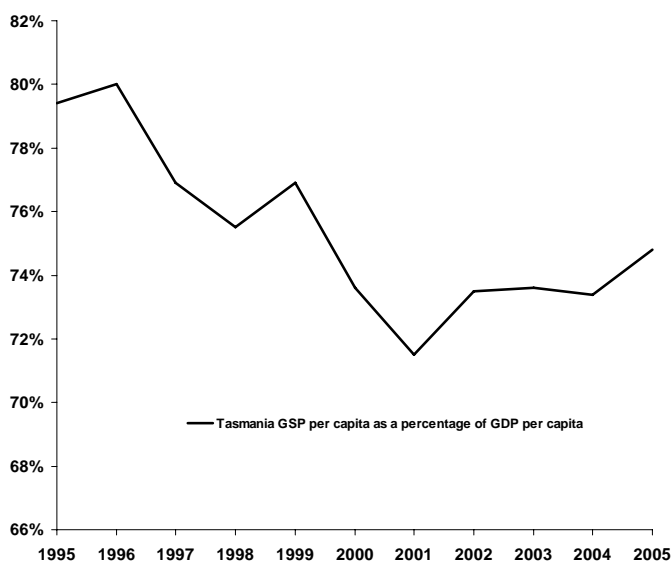
⁹ ABS, 2006, Cat. No. 5206.0, Key national accounts aggregates: annual.

Tasmania's rate of economic growth has averaged around 3.9 per cent.¹⁰ While these recent higher rates of growth have lagged behind the growth that has occurred in resource-rich States such as Western Australia and Queensland, they have exceeded the national average over the past three years.¹¹

However, despite recent improvements in the absolute growth of the Tasmanian economy, on a per capita basis, Tasmania's economy has been in decline relative to Australia (Figure 8.1).

Figure 8.1

TASMANIAN GSP PER CAPITA AS A PERCENTAGE OF AUSTRALIAN GSP PER CAPITA



Source: ABS, 2006, Cat No 5220.0.

Tasmania's GSP in 2004-05 was estimated at \$16.1 billion.¹² For a population of around 480,000 in June 2005, this represented an average level of GSP per capita of \$31,801. By comparison, the average GDP per capita for Australia as a whole (including Tasmania) in 2004 was over 30 per cent higher, at \$42,473.¹³ Relative to Australians living on the mainland, therefore, Tasmanians are worse off in GDP per capita terms. This implies that, on average, the Tasmanian community has not been able to benefit from the significantly increased living standards enjoyed by other Australians over the last decade.

Tasmania has also had historically flat population growth and high rates of unemployment. Tasmania's population saw a compound annual growth rate (CAGR) of 0.15 per cent from FY1995 to FY2004, compared to a CAGR growth

¹⁰ ABS, 2006, Cat. No. 5220.0, Gross State Product, Chain volume measures(a).

¹¹ ABS, 2006, Cat. No. 5220.0, Chain volume measures(a).

¹² ABS, 2006, Cat. No. 5220.0, Gross State Product, Current prices.

¹³ ABS, 2006, Cat No. 52204 Table 1

rate of 1.32 per cent for Australia.¹⁴ Much of Tasmania’s slower population growth has been a function of the migration of Tasmanians to the mainland.¹⁵

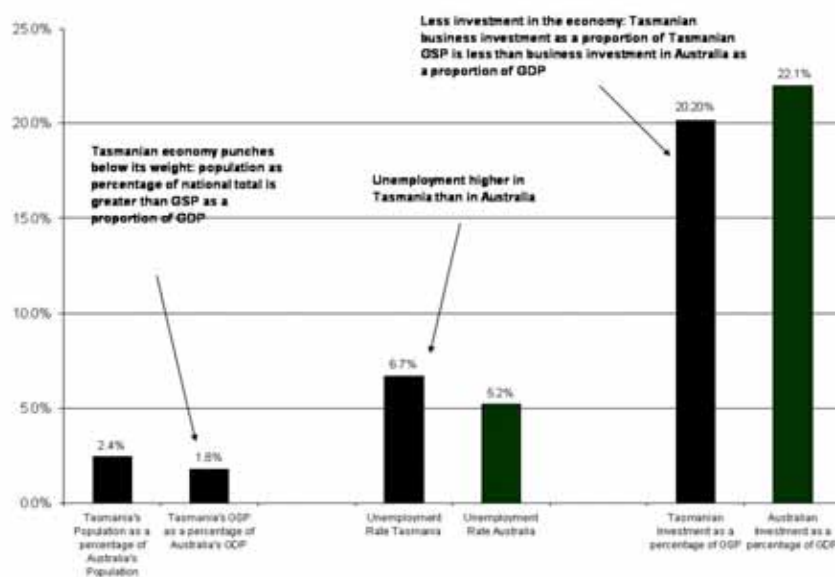
Despite Tasmania’s low population growth, the ratio of the Tasmanian population as a proportion of the Australian population exceeds the ratio of Tasmanian GSP to Australian GDP.¹⁶ This has been a consistent trend since 1995. This also suggests that the Tasmanian economy ‘punches below its weight’ in economic terms relative to its size.

Unemployment levels have been consistently high compared to the mainland. Although this trend has weakened in recent years, in February 2006, unemployment in Tasmania was 6.7 per cent compared to 5.2 per cent in Australia.¹⁷

Figure 8.2 provides key economic statistical comparisons for Tasmania and Australia.

Figure 8.2

COMPARING TASMANIA TO AUSTRALIA — KEY STATISTICS



Source: ABS, 2006, Cat No 5220.0. Most recent data available used in all cases. Employment figures based on February 2006 data. Population data base on 04-05 data. GSP and GDP calculations based on 04-05 data. Investment calculations based on 04-05 figures.

If Tasmania is to attain a higher rate of economic growth, then a sustained higher level of investment will be required. This has been acknowledged by the *Tasmania Together 2020 Strategy*, which is discussed below.

Historically, Tasmania’s level of business investment, as a proportion of GSP, has been low relative to Australia’s national average (Figure 8.2). In 2004-2005 Tasmania’s ratio of Gross Private Fixed Capital Formulation to GSP was

¹⁴ ABS, 2006, Cat. No. 3101.0, Population Change, Summary, Australia ('000).

¹⁵ ABS, 2006, Cat. No. 3101.0, Population Change, Components, States and Territories (Number).

¹⁶ ABS, 2006, Cat. No. 5220.0, Gross State Product, Current prices (\$m).

¹⁷ ABS, 2006, Cat. No. 6291.0, Labour Force, Australia, Detailed, Monthly.

approximately 20.2 per cent. By comparison, the mainland average for the same time period was around 22.1 per cent.¹⁸

Features of the Bell Bay, Northern Tasmanian regional economies

The proposed pulp mill analysed in this IIS would be located in the Bell Bay precinct. This would locate the mill near the George Town, the Port of Launceston, Launceston, and Tamar Valley economies.

Figure 8.3

THE BELL BAY REGION



Source: Touring Tasmania, 2006, <http://www.touringtassmania.info/>

The ABS estimated the population of George Town municipality for 2004-2005 to be 6,679 persons.¹⁹ The unemployment rate in George Town is well above the national average, and sat at 7.6 per cent for the December quarter 2005.²⁰ According to the George Town Council:

George Town's economy relies heavily upon the fortunes of the heavy industrial zone and deep-water port of Bell Bay, which is well supported by a number of light industrial companies, manufacturers, agricultural and viticulture activity and, increasingly retail and tourism operators.

The Bell Bay Precinct is the most significant industrial estate in Tasmania. Other major operators in the region include:

- the Comalco Aluminium smelter, which directly employs around 600 people and a number of contractors;
- the TEMCO ferro-alloy processing plant;

¹⁸ ABS, 2006, Cat. No. 5220.0, Expenditure Components of Gross State Product, Tasmania, Current prices (\$m).

¹⁹ ABS, 2006, Cat. No. 3218.0, Regional Population Growth, Australia.

²⁰ DEWR, Small Area Labour Markets - December Quarter 2005, <http://www.workplace.gov.au/workplace/Category/Publications/LabourMarketAnalysis/SmallAreaLabourMarkets-Australia.htm>.

- the Port of Launceston;
- the CHH Pinepanels medium density fibreboard plant;
- the Eckagranules aluminium powder plant;
- the George Town Seafood processing factory;
- the SVP Industries plant; and
- the Gunns woodchip mills at Long Reach.

The Port of Launceston is the primary export and import centre for the Bell Bay local economy. In 2002-2003 the port handled \$923 million of exports and \$1,228 million of imports.²¹ For the year 2003-04, the port exported approximately 3.7 million tonnes and imported 1.5 million tonnes. Of the total volume of exports of 3.7 million tonnes, 2.7 million tonnes of woodchips were exported (approximately 73 per cent). Exports of pine logs, fibre board and newsprint represented important other wood and paper product components, in addition to the woodchips.

Tasmanian industry development: the importance of value-adding

A major new investment project is likely to be particularly beneficial if it builds on Tasmania's competitive advantages, in terms of resource endowments, and provides the opportunity for further development. An examination of Tasmania's pattern of exports provides some insights into existing areas of comparative advantage.

Tasmania is relatively more reliant on exports than Australia as a whole. Tasmania's exports contributed 14.5 per cent to GSP in 2002-2003.²² However, the composition of Tasmanian exports is also skewed towards commodities. Despite the fact that manufacturing makes a relatively high contribution to Tasmania's economy, the composition of international exports from the State tends to the lower unit value end, particularly when compared to exports from Victoria or New South Wales.²³

Value-adding and the production of more complex differentiated products are important for economic growth in a number of ways, including that they:

- increase prices secured by Tasmanian producers for goods sold, which directly increases GSP;
- result in less sensitivity to exchange rate fluctuations and price competition, than the simpler commodity product (woodchips);
- involve employment of more highly skilled personnel, in both product development and manufacturing; and
- generate economy-wide spillovers through more extensive linkages between firms (suppliers, competitors), leading edge customers and research institutions.

In 2004-2005, the majority of Tasmania's export revenues were generated by sales of woodchips, zinc, aluminium, metalliferous ores and scrap, as well as fish,

²¹ ABS, 2006, Cat. No. 5422.0, International Merchandise Trade, Australia.

²² ABS, 2006, Cat. No. 1384.6. The most recent data available for Australia shows that exports contribute roughly seven per cent to GDP. See ABS Cat. No. 5368.0, January 2006.

²³ ABS, 2006, data available on request, International Trade data base.

crustaceans and molluscs (and preparations thereof).²⁴ Thus the majority of Tasmania's major exports are simply transformed manufactures (STMs). While these can contribute substantially to lifting economic growth when international demand for these products is growing rapidly, there are limitations to the long term sustainability of this growth driven by increases in volumes of STMs alone. Despite strong international demand, the economic growth that can be generated by increasing the volume of STM wood products is limited by supply side constraints such as yield rates and limitations placed on harvesting for environmental reasons.

Given demand and supply constraints that restrict raising the volume in exports of some commodities and STMs, in particular the supply side restrictions on wood products, the key to raising the contribution of international trade to the future wealth and wellbeing of the Tasmanian community lies in increasing the value added component of exports.

Tasmanian economic development policy

Tasmania, recognising the need for a long run framework to facilitate strong economic growth, developed in 2001 a broad strategy called *Tasmania Together 2020*. This strategy set out clear objectives based on community input including 24 Goals and 212 Benchmarks organised around five key strategic areas for growth: community, culture, democracy, environment and economy.

In terms of goals that would drive economic growth, the Tasmanian plan included:

- foster and value vibrant and diverse rural, regional and remote communities that are connected to each other and the rest of the world (Goal 7);
- increase job and meaningful work opportunities in Tasmania (Goal 16);
- maximise the opportunities available through information and other technologies (Goal 17);
- have an internationally-focused business culture that creates business investment and growth, and encourages enterprise, innovation and excellence (Goal 19) [through]:
 - enhancing Tasmania's business operating environment in the international context,
 - increasing the rate of economic growth,
 - fostering a culture of enterprise,
 - increasing access to global knowledge and productive business investment,
 - increasing business confidence, and
 - increasing value-adding.

Progress has been made to achieving many of these goals. This progression, along with other related strategic economic policy and activity, has led to GSP growth and unemployment reductions since 2002-03. Further actions aligned with these goals

²⁴ ABS, 2006, data available on request, International Trade data base. Gunns purchased unreleased 2004-05 export data from the ABS to assess Tasmania's export profile. It was found that a significant proportion (30 per cent) of exports remained in an 'Other/Confidential' category. The ABS was unable to make an estimate of the composition of 'Other'. This makes the profile of Tasmania's exports difficult to assess. Nevertheless important point is that Tasmania's export profile is largely weighted towards commodities.

would be expected to further strengthen the Tasmanian economy, and improve its performance relative to Australian economic standards.

8.4 The Bell Bay Pulp mill — key features²⁵

Gunns Limited (Gunns), which was established in Launceston in 1875 and currently employs more than 1,600 Australians directly, has been examining the economics of constructing a bleached Kraft pulp mill within the Bell Bay Industrial Estate.

The mill would constitute, if it goes ahead, the largest investment to date by the private sector in Tasmania. It would be located at Bell Bay, which is approximately 36 km from Launceston and adjacent to Gunns' existing export chip mills. If the project is approved, Gunns would expect the mill to begin operations in early 2009, following a two-year construction phase.

Once operational, approximately 3.2 Mt to 4.0 Mt of logs that would otherwise have been processed into woodchips for export will be manufactured into 820,000 tonnes per year of hardwood pulp. This pulp would be sold predominantly overseas to be used for the production of paper. Over time, production may increase to a total annual capacity of 1,100,000 tonnes, as inputs from plantation wood increase and engineering design is realised.²⁶ Importantly, Gunns' forestry strategy is independent of the mill: it plans to harvest the same amount of wood whether the mill is constructed or not. The question is whether Gunns sells this wood as woodchips or as processed pulp.

The pulp mill would have its own railroad connection and port for pulp transport and export. It would also be connected to the power grid and a natural gas pipe line.

Gunns has developed plans to meet or exceed existing environmental standards. The pulp mill will be built to the world's most stringent environment standards and will utilise Elemental Chlorine Free (ECF) bleaching processes. It will also be eligible for Renewable Energy Certificates (RECs) for all the power that is produced.

The proposed Gunns pulp mill would significantly increase Tasmania's value-added exports and, as discussed in Section 8.6 below, would contribute to the growth of the Tasmanian economy.

Capital expenditure requirements²⁷

Total direct investment in the proposed pulp mill is estimated at \$1.45 billion²⁸ from 2007-2009.²⁹ This cost is inclusive of land acquisition requirements. Table 8.2 provides an indicative breakdown of the direct investment by major component.

²⁵ This section draws on financial analysis by Jaakko Pöyry. This may be supplied on request, on a commercial in confidence basis.

²⁶ 1,100,000 ADMT/y would represent the maximum capacity of the plant. Wood input data assumed as a basis for economic modelling is consistent with the assumptions of pulpwood supply as per Gunns Anticipated Supply Strategy as detailed in Section 6.2 – Pulpwood Supply of the IIS.

²⁷ This is based on financial analysis by Jaakko Pöyry. This may be supplied on request, on a commercial in confidence basis.

²⁸ All figures are in Australian dollars unless otherwise stated.

²⁹ In present value terms, applying a discount rate of six per cent, this total capital expenditure would be \$1,304 million. A weighted-average cost of capital (WACC) of six per cent was applied to reflect commercial rates of return on alternative investments. Jaakko Pöyry developed this WACC in the course of its financial modelling

To support and operate the proposed capital investment of \$1.45 billion, Gunns would plan to spend a further \$13.4 million to \$20 million in annual additional capital investments in addition to the programmed operating and maintenance expenditures.³⁰ This would bring the total capital investment in the mill from 2007 to 2039³¹ to more than \$2.0 billion.³² This proposed additional support investment to the initial capital infrastructure will ensure sustainability of the mill's operations, over the proposed design life of 30 years. Such investment will ensure that technological obsolescence is avoided and that evolving research and development activities worldwide can be fully incorporated.

Table 8.2

PULP MILL INVESTMENT COSTS, 2007-09, \$2005 PRICES

Component	\$A Million
Wood process investments	\$428.0 m
Chemical recovery and power	\$409.0 m
Water and effluent	\$151.0 m
Administration and departments	\$309.0 m
Waste	\$5.0 m
Power distribution	\$15.0 m
Wharf infrastructure	\$18.0 m
Chemical plant	\$113.0 m
Total Construction Phase Capital Investment	\$1,448.0 m

Source: Financial analysis by Jaakko Pöyry. Additional information may be supplied on a commercial in confidence basis by request.

Energy sector impacts

Due to the planned configuration of the pulp mill's operations, it is expected that the mill will generate a number of positive energy impacts for the Tasmanian economy each year. The mill's operations will result in a significant annual level of renewable energy certificates.³³ The long-term estimate of value of these certificates is \$33.7 million *per annum*.³⁴ The revenues from the sale of these certificates will be

for Gunns. Not also that while payments for construction would be incurred over three years, actual labour would occur over only two years.

³⁰ This is equivalent to one per cent of capital outlays each year for years 1 through 4, and 1.5 per cent for years 5 onwards.

³¹ The mill will have an operational life of 30 years (2009-2039). Financial modelling was conducted by Jaakko Pöyry separate to the preparation of this chapter. The results presented in Section 8.6 are based on computable general equilibrium modelling (which is based on the financial projections but separate from their development). The economic modelling results were not projected past 2030 due to concerns for increasing uncertainty of outcomes over long time frames.

³² In present value terms over the construction phase and 30-year operational life of the mill (2009-2039), applying WACC of six per cent, total capital expenditure would be \$1,527 million.

³³ Gunns understands that increase in the number of credits will reduce their price within the marketplace. Gunns has taken what it considers to be a conservative approach for the long-term REC price.

³⁴ It is noted that the MRET regime is currently intended to end on 31 December 2020. Current financial analysis has assumed that the renewable energy certificates that are a component of this scheme aimed at increasing the uptake of renewable energy will be extended beyond 2020. Jaakko Pöyry's financial analysis of the project may be supplied on a commercial in confidence basis on request. If the sale of renewable energy certificates fell to zero, this would reduce the total revenues and profits of Gunns by approximately \$33.7 million per annum in real terms after 2020 (i.e. 2020-2030) This could potentially reduce the absolute stimulation to the Tasmanian and Australian economies. Note that no assumption has been made for all Gunns shareholders to be

captured by Gunns; however, it is assumed that these benefits (company profit) are ultimately re-distributed to shareholders, which include Australian households. Currently about 90 per cent of Gunns' shares are held by domestic investors. Thus a high proportion of the benefits would ultimately be redistributed to Australians.

The mill will include a power plant that will use renewable forest biomass. This power plant is expected to produce a power surplus of 60 MW per year. This power surplus will be sold into the Tasmanian power grid. Gunns has estimated that the value from the surplus power contribution to the state grid will be between \$16.4 million and \$21.7 million *per annum*. The long-term revenue estimate is \$18.0 million *per annum*.³⁵

Other Tasmanian businesses and industries would also benefit from the sale of 60 MWs of power surplus into the Tasmanian grid. This would equate to roughly two per cent of Tasmania's total installed current generator capacity and five per cent of total energy demanded on average.³⁶ Prices in the National Electricity Market (NEM) are set by through a pooled bidding process whereby generators submit bids to supply a specified quantity of energy for a specified price. Prices are 'stacked' from lowest to highest price until total demand for that half hour is met. If total demand can be supplied by the NEM at low prices, generators who bid high prices into the NEM are excluded from supplying. The highest price that just covers demand requirements sets the price for all generators. The competitive tension created by the risk of being excluded from supplying to the NEM creates incentives for generators to bid lower. Holding all else constant, the presence of an additional supplier would increase competition and this would tend to reduce bid prices. Therefore the added supply available from the pulp mill plant would tend to reduce prices for consumers — including for businesses and households. If competition resulted in lower energy prices, this would benefit businesses and consumers who currently pay the highest prices in the NEM (roughly 29 per cent higher than other NEM regions). Lower energy costs would result in lower operating costs for industry. This could foster the development of other Tasmanian business growth. Lower energy prices for consumers could also free up additional capital that consumers can re-invest in other goods. This could also provide a mild stimulation to other sectors of the economy. Some of these flow-on impacts are discussed further in Section 8.6.

Sourcing of investment components

The proposed capital investment and variable costs associated with the proposed mill's operations will largely remain within the Tasmanian economy. Table 8.3 provides a summary of the extent of Tasmanian sourcing of project components.

As the table demonstrates, most of the mill's inputs will be sourced from businesses in Tasmania. The utilization of a wide range of services (gas, electricity, water, sewerage, solid waste removal) will result in increased service revenue and increased utilization of existing service infrastructure in Tasmania. Bulk purchase contracts of natural gas, via the Tasmania Gas Pipeline will be a significant stimuli to Tasmanian gas service providers. Other Tasmanian firms will benefit from

located in Tasmania, therefore all Australian regions would see a similar rate of reduction in total economic activity. Given the size of the Australian economy, the difference in outcomes would likely be modest.

³⁵ This is based on financial analysis by Jaakko Pöyry. This may be supplied on request, on a commercial in confidence basis.

³⁶ This was calculated by averaging total demand in December and June for Tasmania in 2005. See NEMMCO for additional data and analysis.

purchases by Gunns of potable water and sewerage and solid waste removal. For example, Gunns has estimated that water supply and effluent disposal expenditures will amount to \$3.6 million per annum over the life of the mill.³⁷ The implications of these expenditures for regional economic growth and industry development are explored further in Section 8.6.

Table 8.3

SUMMARY OF PROJECT COMPONENTS

Project costs and benefits	Percentage of inputs sourced from Tasmania	Nature of the cost, benefit
Project costs		
Operating phase personnel	100% ^a	Fixed
Wood and chipping costs (including road and rail transport)	100%	Variable
Chemicals	80%	Variable
Fuel (gas, biofuel)	100%	Variable
Water	100%	Variable
Sewage disposal	100%	Variable
Solid waste disposal	100%	Variable
Operating and packing materials	90%	Variable
Maintenance materials	90%	Fixed

Source: Gunns Limited. Note ^a: It is assumed that 80 per cent of the personnel that will work at the Gunns plant will be already living in Tasmania. A further 15 per cent are expected to be hired from mainland states, and a further five per cent are expected to be hired from overseas. However, Gunns does not intend to operate a fly-in, fly-out workforce. Therefore 100 per cent will live in Tasmania for the life of the mill once it is operational.

Increased purchasing power for other Tasmanian businesses

Given its scale, and the range of chemicals that are processed and/or produced, the pulp mill chemical plant would be expected to provide a significant positive impetus to manufacturing opportunities in Tasmania. While the prime objective of the plant is to produce sodium hydroxide, oxygen and chlorine dioxide for the cooking and bleaching processes, a number of other chemicals are either required as inputs or are produced as intermediate products in the chemical reactions that take place. The chemicals that are processed in significant quantities include:

- sodium chloride;
- sodium hydroxide;
- chlorine;
- hydrochloric acid;
- hydrogen;
- hydrogen peroxide;

³⁷ As the mill ramps up, expenditure will rise from \$2.3 million to \$3.6 million per annum.

- chlorine dioxide;
- sodium chlorate;
- oxygen;
- nitrogen; and
- argon (small volumes).

The two major input chemicals, sodium chloride and sodium hydroxide, will be purchased in bulk via dedicated shipments. Other Tasmanian manufacturers will have the opportunity to access these and the other chemicals at world competitive rates. This opportunity has not been available before in Tasmania, or at least certainly not to the same scale. Increased access to chemicals at cost effective prices could potentially provide the impetus for new industries to develop. The following two examples are provided as an indication of what could develop:

- *Utilization of hydrochloric acid in the extraction of metals from mine tailings* — Initial communication has been made by Gunns with a company that has developed an extraction process that requires hydrochloric acid. The company has also expressed an initial interest in purchasing electrical energy.
- *Use of hydrogen for the production of fuel cells* — Initial contact via the Department of Economic Development has indicated Hydro Tasmania is considering options for using hydrogen as a fuel — both in fuel cells and more conventional internal combustion processes.³⁸

New technologies to be introduced

The project will also bring some leading edge, new pulp technologies to Tasmania. Exposure to these new technologies may have immediate spillover benefits to other existing industries or help to provide a platform from which new businesses may develop. Significant innovations and technical developments that would be incorporated in the new mill include the following.

- High pressure boilers would be built to source as much power as possible from biomass. This is a trend within the pulping industry but has only been adopted in a few locations worldwide. The biomass employed would be wood and forest waste.
- More water would be recycled than is normal practice for pulp mills globally. On average, pulp mills consume 40,000 litres of fresh water per tonne of pulp produced; the Bell Bay pulp mill, because of its recycling focus, will use only 23,500 litres per tonne. This would represent a saving of over 40 per cent (or 13.5 megalitres per year) compared with existing mills.³⁹
- In order to manage the recycling of water and other processes, the plant would require new non-process element innovations. These innovations have only been recently used in some new plants, and would represent a cutting edge development in pulping technology. Most mills are not equipped with these new technologies.

³⁸ Statement by Government of Tasmania.

³⁹ In terms of the total impact of Gunns' water purchase on environmental outcomes in Tasmania, it should be noted that Gunns will pay the full economic cost for the water, which is captured in the purchase price. Hydro Tasmania is therefore 'compensated' for the opportunity cost of the water. Additional analysis of environmental impacts can be found elsewhere in the IIS.

- The pulp mill would use natural gas as fuel for key processes, including the operation of the lime kiln and the start-up/backup processes for the recovery/power boilers. Pulp mills usually use fuel oil to power these processes.

Gunns would also install a continuous monitoring facility of mill emissions. This would also go beyond normal greenhouse gas management practice.⁴⁰

In total, these innovations would ensure that Australia's wood resources are effectively and efficiently utilised. This project is therefore aligned with the *2000 Forest and Wood Products Industry Action Agenda* goal to increase the credibility of Forest Operations and Products and to seize opportunities for product development innovations. It is also aligned with the goals of the *Tasmania Together 2020* strategy, which aims to 'ensure there is a balance between environmental production and economic and social development' and to 'ensure our natural resources are managed in a sustainable way now and for future generations'. Through exposure to new technologies, and significant training courses in construction and pulp mill operating procedures (see Section 8.6), the mill is expected to have an important effect on raising the level of skills in the State's labour force. As the labour force turns over through time, an increased level of skills will permeate through the Tasmanian workforce.

8.5 Estimating the total economic impacts of the Bell Bay Pulp mill — methodology

Quantitative analysis — computable general equilibrium analysis

An analysis of the Bell Bay Pulp mill alone, as the largest private sector investment in Tasmania to date, would show large increases in job creation and economic activity. However, the mill will also have an impact on a wide range of businesses. These impacts will be greatest for Tasmanian business, but will also be observed on the mainland. These impacts will arise through increased demand for goods and labour. Many businesses will grow as a result. This will make the total impact on the Tasmanian and Australian economies larger than the mill alone.

These wider economic impacts cannot be estimated with any accuracy without the use of a complex computable general equilibrium (CGE) model. CGE modelling represents the best approach to estimating the economic impacts of the proposed mill. This is because in order to understand the impacts of the project, it is necessary to consider not only the direct (partial) economic effects of the proposed pulp mill, but also the flow on impacts that could be expected to be observed in the wider economy. For example, while a new major project like a pulp mill will create immediate impacts by providing employment, other businesses that supply the mill will expand while additional incomes that are created will, in large part, be spent. A comprehensive assessment of the economic impact of a project needs to account for these flow-on effects. A CGE model accommodates this by showing the relationships between changes in microeconomic activities — such as a pulp mill development — and macroeconomic outputs.

In the past, other methods have been used to try to understand the flow on effects of new investments or industries within the economy. For example, multiplier tables

⁴⁰ Emissions regulations and guidelines require annual reporting. The aim of continuous monitoring is to demonstrate that the Pulp Mill more than satisfies emissions regulations pertaining to the mill.

were often used to show the impacts of an investment on employment and other macro economic variables. Today, multiplier analysis is generally held by economists and governments to be a sub-optimal methodology for estimating general equilibrium outcomes. These methods lack the sophistication of CGE models, and their results generally overstate impacts due to failures to account for key constraints in the markets for labour, capital and goods.

The CGE models operated by the Centre of Policy Studies (CoPS) at Monash University are recognised by industry and government as the pre-eminent tools for economic impact assessment. Therefore in order to undertake this analysis, the most detailed model available in Australia, the MMRF-Green model, developed and operated by CoPS, has been employed. Details of the model and the assumptions underpinning the results presented in this chapter are contained in Appendix B.

The methodology for using the CoPS MMRF-Green model to determine the impact the proposed development involves imposing a ‘shock’ onto the model’s ‘base case’, or business-as-usual projection for future economic outcomes. The comparison between outcomes under the business-as-usual projection and outcomes under the ‘shock’ scenario then provides an indication of the impact of the project being modelled. This is the industry standard method for assessing economic impacts. In modelling the impacts of the proposed pulp mill at Bell Bay, a scenario was run where the mill is constructed and enters into production by 2009, with the national and State/Territory economies adjusting away from base case trends, to accommodate the new mill.

It should be noted that the economic projections within this section of the IIS are based on a mill output ranging from 820,000 tonnes to 960,000 tonnes of pulp over the life of the mill. This range is considered to be the most likely given the anticipated procurement and sales projections. The mill has been configured to produce up to 1,100,000 tonnes of pulp. Should this capacity be realised, then the economic impacts would be further strengthened. On this basis, it was assessed that the outputs from the CGE modelling could be considered conservative.

Qualitative analysis — Stakeholder consultations

Complementing the quantitative analysis of the MMRF-Green results, this chapter also includes some qualitative discussions of industry impacts. These qualitative assessments were generated from extensive stakeholder consultations. Appendix A provides a list of the persons interviewed during the course of the IIS preparation.

Key assumptions for the MMRF-Green modelling simulation

The exogenous financial inputs — or shocks — used to simulate the development of the proposed pulp mill in the modelling were based on financial analysis by Jaakko Pöyry, and can provided by Gunns on a confidential basis on request.⁴¹ Projections were made for the impact of the pulp mill from 2007 to 2030.⁴²

⁴¹ This information will be made on a commercial in confidence basis on request.

⁴² The mill will have an operational life of 30 years. The economic modelling was not projected past 2030 due to concerns for increasing uncertainty of outcomes over long time frames.

Capital expenditure for the initial investment commences in 2007, peaks in 2008 and finishes in 2009. Total capital expenditure on the new mill would equal \$1,448 million.⁴³

Other relevant assumptions in relation to the construction and operating phase of the project are:

- mill operations would start up in 2009 and reach their maximum value from 2019 at \$625.9 million of revenue annually;
- relative to the baseline, mill employees would be sourced from the following regions for the construction and operating phases:

Region	Construction	Operating
Tasmania	40%	80% ⁴⁴
Other Australian States	50%	15%
Foreign	10%	5%

- 100 per cent of the wood, gas, biofuels, water and effluent services, personnel and overhead inputs required for operations would be sourced from Tasmania;
- 90 per cent of the operating, packaging and maintenance materials required for the mill's operations would be sourced from Tasmania;
- during the operating phase, 80 per cent of the chemicals would be sourced from within Australia;
- on average roughly 90 per cent of the pulp produced by the mill would be exported with the remaining being sold to domestic markets;
- 90 per cent of shareholders would be expected to reside in Australia; and
- 70 per cent of required project debt would be sourced from within Australia.

Because of constraints on the availability of logs for woodchips in Tasmania, increased pulp production by the mill would result in a reduction in other forms of secondary log production. Thus the project was also assumed to result in the reduction of woodchip output.

Other assumptions underpinning the MMRF-Green model results are also presented in Appendix B.

Interpretation of modelling results

In examining the results presented below, it is important to note three issues relating to the way the MMRF-Green model works:

- First, as noted, all results for the mill construction scenario are presented relative to the base case or business-as-usual scenario where it is assumed that

⁴³ All values are presented in constant \$2005 prices.

⁴⁴ The model compares the scenario where the mill is built to one where the mill is not constructed in Tasmania. In the scenario where the mill is constructed, it is assumed that 20 per cent of the mills' workers are sourced from other Australian states (15 per cent) and from overseas (five per cent). These persons will become Tasmanians once beginning work at the mill — that is, they will not be a fly-in, fly-out workforce. However for the purposes of modelling the impact of the mill it is necessary to consider the counterfactual. In the event that the mill is not constructed these persons are assumed to continue to work in their original regions (not Tasmania).

the pulp mill project does not occur. This means for example, that it would be inaccurate to say that as a consequence of the pulp mill that ‘GSP would increase by X per cent’; it would be more accurate to say that ‘GSP would be X per cent higher than it would otherwise have been, had the pulp mill proposal not gone ahead’.

The following analysis presents graphical representations of the stimulus to the economy. The graphs show the increase every year above base case expectations. The results are not cumulative.

- Secondly, the workings of the model mean that it is virtually impossible for any project to create a sustained increase in employment at a national level. This is because of the way real wages are assumed to shift (increase) in response to an initial increased demand for labour so as to return the labour market to an equilibrium position (by reducing demand over time). Within this national constraint, however, the model does allow significant employment gains in individual States and regions.
- Thirdly, it is important to note that the results show the gross impacts on the economy of the investment in the pulp mill. That is, no adjustments were made to Government or private household budgets to provide for the expenditure on the mill. This essentially means that the model assumes that no other investments are abandoned as a result of the new investment in the mill.

Other key points to note in interpreting the results are:

- *When results for Australia are presented, they include the impact of the change in economic activity in Tasmania.*
- The pulp mill essentially draws resources — capital and labour — away from the mainland Australian economy and towards Tasmania. This means that while economic outcomes in Tasmania are better than they would otherwise have been, this may be at the expense of economic outcomes in other States and Territories. Nevertheless, the overall net impact of the pulp mill on the national economy is generally positive. The Australian economy as a whole is better off as a result of the development because the positive effects in Tasmania outweigh any negative effects in other States.
- The stimulus to the national economy generated by the pulp mill is less than the stimulus to Tasmania. This is because the new net exports of pulp generated by the mill ‘crowd out’ other export and import-competing sectors. This occurs as the real exchange rate strengthens in response to the increase in net exports, thus reducing the competitiveness of Australia’s other traded commodities.

8.6 Key economic impacts of the proposed pulp mill

This section presents the projected economic impacts of the proposed pulp mill development at Bell Bay. *It includes results from quantitative CGE modelling and qualitative discussions about the impact expected for various industries.*

Investment

The development of the pulp mill would result in an initial increase in investment. The increase in investment across Tasmania would be larger than the size of the investment in the pulp mill by Gunns, because the increase in employment and

wages arising from the pulp mill would result in an increase in demand for other goods and services. As demand for these other goods and services would be expected to increase, so would production in those industries. This would lead to an increase in the profitability of and investment by those industries. Investment by these other industries was assumed to occur with a lag.⁴⁵

In Tasmania, the peak expansion in investment is projected to occur in 2008. Investment for the State in that year would be \$1,067 million (or 20.0 per cent) higher if the mill were constructed than it would be under base case projections (Figure 8.4). Although no one project can be reasonably expected to generate long run convergence with mainland investment rates, this would significantly contribute to the goal of ‘parity’ with the mainland in terms of investment as a proportion of total economic activity. Indeed by 2008, MMRF-Green modelling projects that investment as a proportion of GSP will have increased by 4.7 per cent relative to current levels (See Figure 8.2) while Australian investment as a proportion of GDP is expected to attenuate by 0.1 per cent relative to current levels. This would result in a short run increase in investment levels for Tasmania. In the longer run, the model predicts that historic ‘median’ levels of economic activity continue. Thus over time Tasmanian investment as a percentage of GSP are projected by MMRF-Green to trend back towards long run averages relative to Australian investment and GDP growth.

After the peak expansion in investment relative to the counterfactual in 2008, investment would remain higher than would otherwise have been the case. By 2030, the positive increase in investment in Tasmania would be expected to be \$149 million (2.2 per cent) greater than the base case projection.

Figure 8.4

IMPACT OF PROPOSED BELL BAY PULP MILL — INVESTMENT (\$2005, MILLIONS)



Source: CoPS. Note the above results are not cumulative impacts, but annual deviations from base case projections for Australian and Tasmanian investment levels. Results for Australia include the impact of the change in economic activity in Tasmania. See Section 8.5, Interpretation of modelling results.

⁴⁵ See Appendix B for more details about MMRF-Green model assumptions.

The NPV_{5%}⁴⁶ of the total increase in investment each year relative to the base case from 2007 to 2030, when compared to the base case, would be \$3.1 billion.

As noted in Section 8.2 above, higher levels of investment are critical to raising Tasmanian living standards. Currently, Tasmania lags the national average in terms of investment levels as a proportion of GSP. This project is very important to the economic wellbeing of the Tasmanian community in the future, in line with *Tasmania Together 2020* goals.

Nationally, investment would be expected to be also boosted by the pulp mill development.⁴⁷ This stimulation would be driven in the main by the growth in Tasmania, but also by some inputs sourced from the mainland, including chemicals and other goods. In the peak investment year 2008, national investment levels would be expected to be boosted by \$1,023 million (0.4 per cent) relative to the base case. The stimulation to the national economy would be less than that observed in Tasmania, reflecting the migration of economic activity to Tasmania. The stimulation to Australian investment would be 95 per cent of Tasmanian stimulation in 2008 and 37 per cent of the stimulation to Tasmanian investment in 2030. Nevertheless, the overall net impact of the pulp mill on the national economy would be positive as the Australian economy as a whole would be better off because the positive effects in Tasmania would outweigh any negative effects in other States.

Adding value to its principal natural resource, in a responsible and ecologically sustainable way, would likely generate significant returns in terms of business and investor confidence in the region. Strong economic growth and business investment will foster growth in investor and business confidence in Tasmania. Large investments that increase activity in the region could be expected to give rise to awareness that Tasmania is ‘open’ for business and new investment. The London Business School⁴⁸ has investigated the ability of signals of this nature to influence investment decisions, and it notes that strong signals about the quality of the operating environment can strongly impact the amount of attention a region receives in terms of its viability as an investment location. The success of a major project such as the pulp mill in Tasmania would be expected to send strong positive signals about Tasmania as an investment location globally.

Gross Domestic Product (GDP) and Gross State Product (GSP)

Both GDP and GSP — which are equivalent to the sum of government spending, private consumption, investment and net export activity in the economy — are expected to expand in response to the pulp mill in line with:

- the increase in investment, due to increase pulp production and subsequent increases in demand for other goods and services;

⁴⁶ The Net Present Value, or NPV, of an investment or stream of cash flows quantifies the present value of future revenues and expected costs associated with the investment. This is premised on the concept of the ‘time value of money’: generally cash is worth less tomorrow than it is today. To determine the present value of a project or investment, future cash outlays or revenues are discounted back at a social discount rate of five per cent. Discounting cash flows enables decision makers to compare different investments on a like-for-like (present value) basis. The selection of this rate (five per cent) was based on the assessment that the returns would be expected to occur if the mill were to be constructed, making the notional rate of ‘risk free’ government bonds the appropriate ‘next best alternative’ investment. This reflects the opportunity cost of capital.

⁴⁷ When results for Australia are presented, they include the impact of the change in economic activity in Tasmania. See Section 8.5, Interpretation of modelling results.

⁴⁸ See Birkenhead, J., and C. Bouquet, 2005, *Getting the Attention You Need: Strategies for the Australian Subsidiary*, London Business School, in association with the CEO Forum.

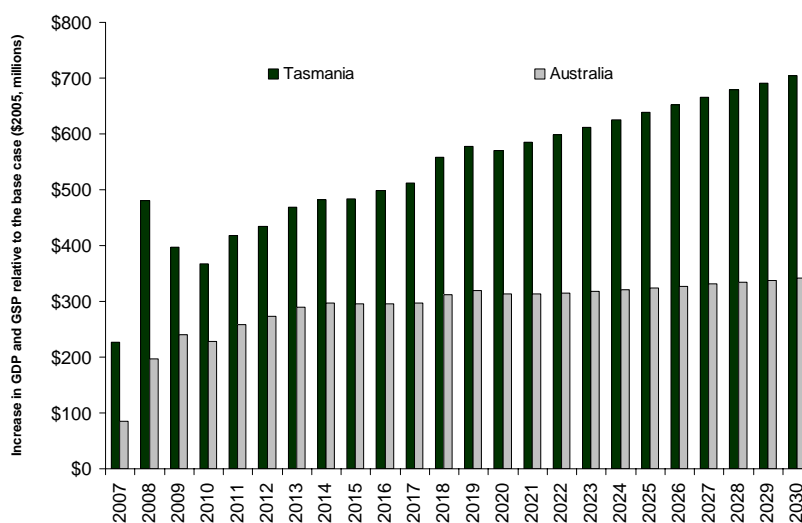
- the increase in net exports generated when woodchip exports would be replaced with higher value pulp exports produced at the mill; and
- increasing employment levels and wage rates, which would lead to higher levels of household income and consumption.

Investment would be the primary driver of the growth in GSP and GDP in the short run. The long run stimulation to GSP and GDP would be driven by impacts of the latter two factors. Strong employment growth, which would provide a strong stimulus to wages and consumption, together with export growth would be expected to provide an ongoing stimulus to regional and national economies. Although the model does not predict regional rates of unemployment, this project would be expected to reduce rates of unemployment due to the increasing demand for labour due to rising economic activity.

In line with this, Tasmania’s GSP, if the pulp mill proceeds, would be substantially higher in each year than what would have been expected if the pulp mill had not gone ahead (Figure 8.5). The peak increase in Tasmania’s GSP in 2030 is projected by the MMRF-Green model to be approximately \$704 million (2.5 per cent) above base case expectations. The NPV_{5%} of the total of the annual increases in Tasmania’s GSP from 2007 to 2030⁴⁹ would be roughly \$6.7 billion.

Figure 8.5

IMPACT OF PROPOSED BELL BAY PULP MILL — GDP AND GSP (\$2005, MILLIONS)



Source: CoPS. Note the above results are not cumulative impacts, but annual deviations from base case projections for Australian and Tasmanian GDP and GSP levels, respectively. Results for Australia include the impact of the change in economic activity in Tasmania. See Section 8.5, Interpretation of modelling results.

Nationally, GDP would also increase in every year of the forecast period relative to the base case. The peak increase in GDP relative to the base case would be expected in 2030. The long run growth in the national economy would be driven by both the growth in Tasmania and the modest stimulation to mainland Australian businesses

⁴⁹ As noted earlier, the results show the gross impacts on the economy of the investment in the pulp mill. That is, no adjustments were made to Government or private household budgets to provide for the expenditure on the mill. NPV calculations should be interpreted with this in mind.

due to Gunns purchases (chemicals). In 2030, GDP would be \$341 million higher than would otherwise have been the case (0.03 per cent increase above base case projections). The NPV_{5%} of the expected increases in GDP compared to the base case from 2007 to 2030 would be \$3.8 billion.

Because both Tasmania’s GSP and Australia’s GDP are projected to increase as a result of the mill, and due to the size of these changes relative to their base investment and GSP levels, only small growth is expected to be observed in the ratio of Tasmania’s GSP to Australia’s GDP. The model projects a small 0.1 per cent change in this ratio relative to current levels (see Figure 8.2). Population growth in Tasmania is expected to increase, although again by a small percentage of only 0.1 per cent relative to current levels as shown in Figure 8.2 above.

Consumption

Consumption, which serves as a proxy for the community’s economic welfare, is essentially determined by total household income. If the pulp mill goes ahead, consumption is expected to increase at both a national and State level. This occurs as increases in production in the pulp industry lead to increases in both investment and employment levels in this sector. In subsequent rounds of economic impacts, production increases in other industries as well. This in turn generates further increases in total investment and employment and therefore increased household disposable income, which is the sum of wages, dividends to Australians (including from Gunns), and government transfer payments, less direct income tax.⁵⁰

Figure 8.6

IMPACT OF PROPOSED BELL BAY PULP MILL — CONSUMPTION (\$2005, MILLIONS)



Source: CoPS. Note the above results are not cumulative impacts, but annual deviations from base case projections for Australian and Tasmanian consumption levels. Results for Australia include the impact of the change in economic activity in Tasmania. See Section 8.5, Interpretation of modelling results.

⁵⁰ Modeling based on tax rates as at February 2006.

Figure 8.6 shows the impact of the proposed mill on consumption nationally and in Tasmania. By 2030, the pulp mill is predicted to increase annual national consumption by \$245 million (0.04 per cent) and Tasmanian consumption by \$378 million (2.6 per cent). In NPV_{5%} terms over the period 2007 to 2030, the gains are \$2.7 billion and \$3.3 billion for Australia and Tasmania, respectively.

Greater levels of business investment, business activity and employment and household wages are positively correlated with consumer confidence. The increase in expected disposable household income would be expected to support an increase in consumer confidence. This is further reflected in higher rates of private consumption.

Trade balance: imports and exports over the operating period

In the short run the MMRF model yields what appear to be counter-intuitive results. This is due to assumptions about the sourcing of capital for the mill's construction, which is assumed in the MMRF-Green model to result in an appreciation of the Australian dollar. In the MMRF-Green model it is assumed that the majority of the funding for the Bell Bay project is ultimately sourced from overseas. This has the effect of moving the capital account balance towards surplus. Australia's capital account is the net flow of public and private international investment. It includes foreign direct investment plus changes in holdings of stocks, bonds, loans, bank accounts and currencies. With banks sourcing funding from overseas for the \$1.45 billion investment, this leads to an increase in the capital account and an increase in demand for Australian dollars to service the repayment of the debt. This contributes to an appreciation of the Australian dollar, which affects all trade-exposed industries. Real appreciation makes Australian products less competitive on world markets, leading to a reduction relative to base case values in export volumes. Thus the initial 'shock' to the model of funding such a large investment results in downward pressure on exports from Australia and Tasmania.

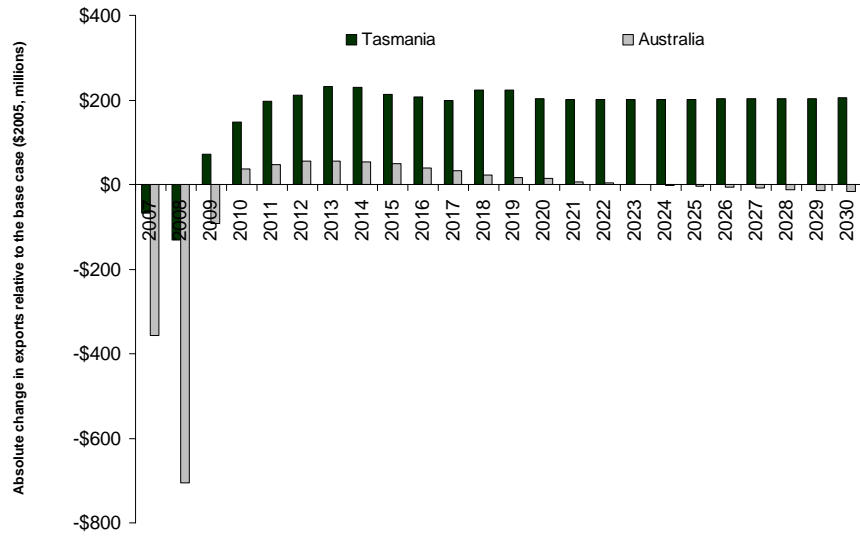
In the longer run, in line with the core value-adding element of the project, Tasmania's export profile would be expected to increase relative to the base case once exports of pulp begin from 2009 onwards (Figure 8.7). By 2030, exports growth in Tasmania would be expected to rise to \$204 million above base case projections (2.3 per cent). In NPV_{5%} terms over the operating phase from 2009-2030, exports would be \$2.3 billion dollars greater than under base case projections.

However, again the increase in exports over the medium term leads to an appreciation of the Australian dollar above base case projections. The net increase in exports due to the presence of the mill increases the value of the Australian dollar such that the competitiveness of other Australian industries is reduced on the global market. Hence Australia relative to Tasmania sees only a mild increase in exports in the medium run and over time exports are slightly less than would have otherwise been expected had the mill not been constructed.

In the longer run, the Australian dollar is expected to depreciate back towards base case levels. In 2030, Australian exports are \$16 million less than would have otherwise been expected (though in percentage terms this is so small that it is a 'zero' percentage deviation from base case projections).

Figure 8.7

IMPACT OF PROPOSED BELL BAY PULP MILL — EXPORTS (\$2005, MILLIONS)

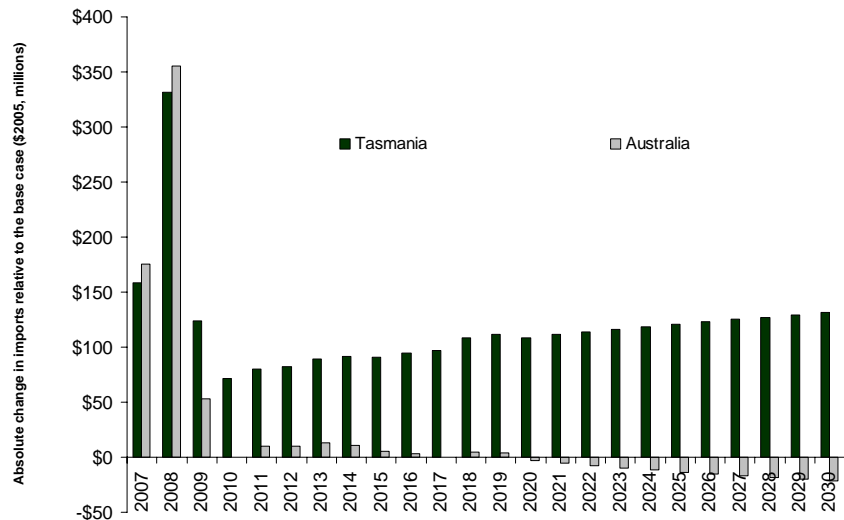


Source: CoPS. Note the above results are not cumulative impacts, but annual deviations from base case projections. Results for Australia include the impact of the change in economic activity in Tasmania. See Section 8.5, Interpretation of modelling results.

On the other side of the ledger, Australia tends to import more goods and services than would have otherwise been the case as the rising Australian dollar increases Australia’s purchasing power (Figure 8.8).

Figure 8.8

IMPACT OF PROPOSED BELL BAY PULP MILL — IMPORTS (\$2005, MILLIONS)



Source: CoPS. Note the above results are not cumulative impacts, but annual deviations from base case projections. Results for Australia include the impact of the change in economic activity in Tasmania. See Section 8.5, Interpretation of modelling results.

Thus in the short run, the sharp increase in the exchange rate, as a result of the large sourcing of capital from overseas, is assumed by the MMRF-Green model to result in a large increase in imports in the short run. As the model ‘recovers’ from this shock — that is, as the exchange rate begins to again depreciate — the net increase in imports reduces.

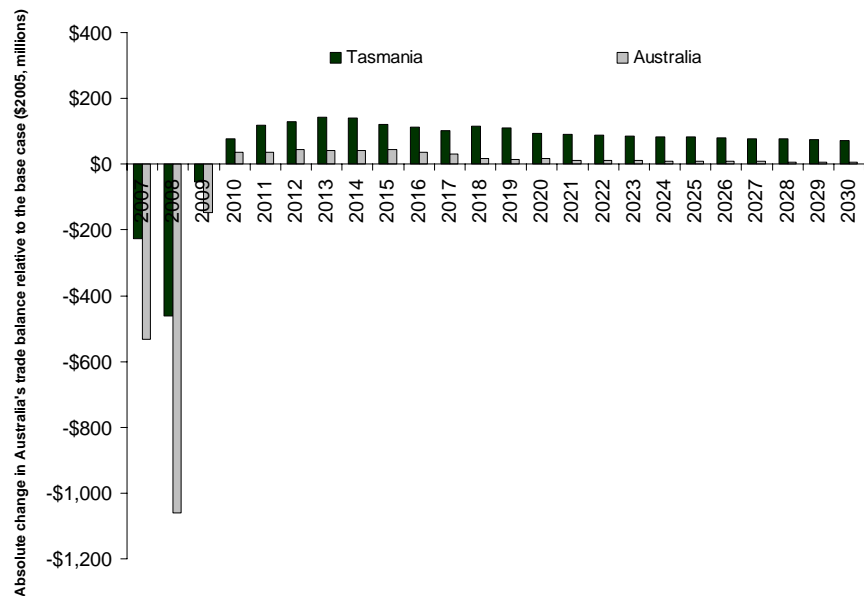
In the longer run, as with exports, the Australian dollar is expected to depreciate such that Australian purchasing power returns back towards base case levels. By 2030, imports by Australia would be expected to be \$22 million less than the counterfactual where no mill was constructed. This represents a small 0.01 percentage change from base case expectations.

In terms of Australia’s trade balance, Australia’s net exports are projected to increase by MMRF-Green. Comparing the increase in exports with the increase in imports, it is clear that on net, this results in an improvement in Australia’s trade balance on the whole. The initial decline in the trade balance is due to the shock of sourcing large amounts of capital from overseas (Figure 8.9).

In the long run the improvement to Australia’s trade balance was not projected by MMRF-Green to be statistically different from base case expectations (\$6 million, above base case expectations). The net improvement in 2030 of Tasmania’s trade balance was expected to be \$72 million above base case expectations.

Figure 8.9

IMPACT OF PROPOSED BELL BAY PULP MILL — TRADE BALANCE (\$2005, MILLIONS)



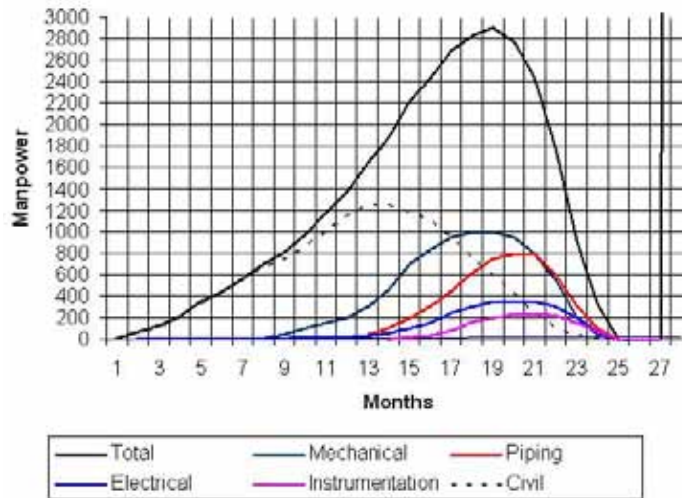
Source: CoPS. Note the above results are not cumulative impacts, but annual deviations from base case projections. Results for Australia include the impact of the change in economic activity in Tasmania. See Section 8.5, Interpretation of modelling results.

Employment and skills

This section describes impacts on employment levels as a result of the mill. Outputs from the modelling process are based on annual estimates, which lacks the sophistication of the smooth ramp-up and ramp-down that will occur in reality as demonstrated in Figure 8.10.

Figure 8.10

IMPACT OF PROPOSED BELL BAY PULP MILL — EXPECTED LABOUR REQUIREMENTS DURING THE BELL BAY PULP MILL CONSTRUCTION PHASE



Source: Jaakko Pöyry.

The MMRF-Green model assumes that employment in the economy will be aligned with the investment ‘shocks’ to the model. It was assumed that Gunns would invest 30 per cent of the total required capital (\$1.45 billion) in 2007, a further 60 per cent in 2008 and a further 10 per cent in 2009. Jaakko Pöyry by contrast assumed that there may be a slight lag between the capital outlays and the actual completion of the work. Therefore some of the MMRF results appear to precede Gunns anticipated employment requirements. Importantly, there will be a progressive ramp-up and ramp-down of construction employment over the construction phase, with the majority of the workers required in 2008-2009. Thus while there may be slight differences in the MMRF-Green and Gunns projections between 2008 and 2009, these should be viewed as indicating the same pattern of outcomes. The key insight from the MMRF-Green modelling is that the total employment impact will be larger than employment projections for the mill alone, due to stimulation to the wider economy.

The development of the pulp mill would be expected to result in significant employment benefits for both Tasmania and Australia. Table 8.4 shows the number of persons estimated to be required during the construction phase by Jaakko Pöyry. It is estimated that 40 per cent of these jobs would be filled by Tasmanians. It is expected Tasmanians would be represented in all job categories (civil works, mechanical works, etc).

Table 8.4

CONSTRUCTION PHASE EMPLOYEES

	Peak Construction phase employment requirement (2008-2009)
Civil Works (ASCO 2124 and ASCO 4)	800
Mechanical Works (ASCO 411)	800
Piping Works (ASCO 443)	600
Instrumentation (ASCO 411)	100
Electrical (ASCO 431)	200
Total	2500

Source: Jaakko Pöyry. See Figure 8.10 for Jaakko Pöyry estimates on the ramp-up of employment by job category. Additional data can be provided on request.

During the operating phase, the pulp mill itself is expected to employ around 292 people. This is expected to be consistent over the life of the mill. The types of jobs, as classified in accordance with the ASCO job classifications, that would be required are:

- Salaried Staff (ASCO 121) 72 persons
- Hourly Paid — Production (ASCO 7294) 77 persons
- Hourly Paid — Maintenance (ASCO 7294) 63 persons
- Hourly Paid — Warehouse and Harbour (ASCO 4) 48 persons
- Chemical Plant (outsourced) (ASCO 7293) 32 persons

Jaakko Pöyry expects 100 per cent of the people in working at the mill will be living in Tasmania — that is, Gunns' operational workforce will not be fly-in, fly out.⁵¹

The large increase in demand for construction workers during the construction phase has been anticipated as one of the major challenges for the project. Gunns plans to manage the need for workers in Tasmania through a collaboration with TAFE Tasmania, in order to train enough persons to meet its needs (See 'Impact on the education, training and Australian skills base' below). The net impact of this will be an increase in Australia's total skills base following the construction of the mill. This will lead to an enhanced capacity for wealth creation in the long run.

Gunns also intends, if the mill is constructed, to implement a management plan for limiting the impact of the influx of persons into the Georgetown precinct. In the absence of a management proposal this could create an artificial boom in the accommodation sector and/or adversely affect the tourism sector. Gunns has planned for the construction of accommodation facilities to house up to 800 workers to ameliorate these potential effects.

Due to the multiplier impacts on other industries, the model suggests that the wider employment impacts would be much larger than the above figures alone (Figure 8.11). In Tasmania, MMRF-Green modelling projects employment is expected to

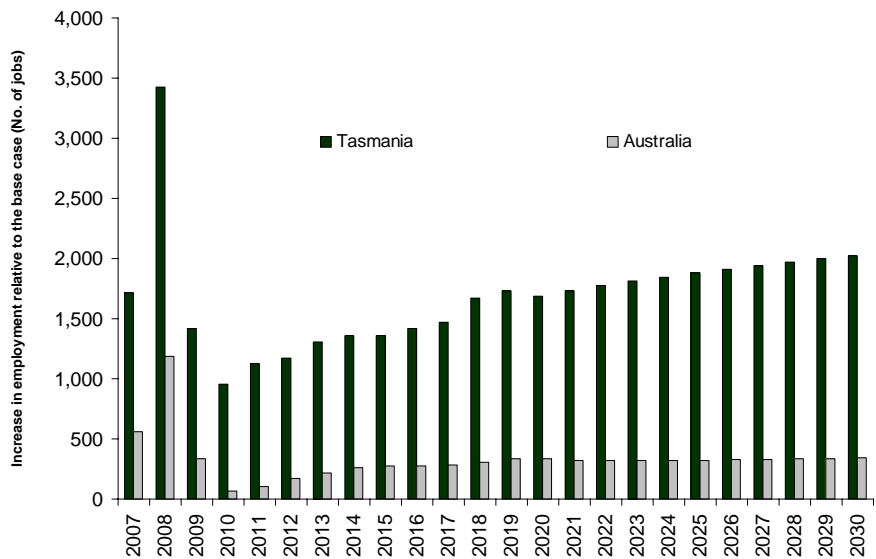
⁵¹ It is expected that roughly 80 per cent will be already living in Tasmania when hired by Gunns, a further 15 per cent will move to Tasmania from other states, and a further five per cent from overseas.

see its greatest increase over the base case in 2008. Approximately 3,400 more jobs would be expected in Tasmania in 2008 than would otherwise have been the case if the mill were not constructed. On average during the operational phase of the mill, employment in Tasmania would be expected to increase by 1,617 jobs than would have otherwise been the case. Employment in Tasmania is expected to grow throughout the operating phase of the mill, and by 2030 there would be around 2,000 additional jobs in Tasmania as a result of the pulp mill.

This increase employment is comprised of an increase in the number of hours worked and an increase in the number of persons employed. The MMRF-Green model assumes that as the economy expands, there is an increase employed persons become more productive. By 2030, total employment in Tasmania, in terms of hours worked, increases relative to its base case level by 2.0 per cent. The increase in hours worked is assumed to be met by a combination of a 0.7 per cent increase in the number of full and part-time jobs and a 1.3 per cent increase in the number of hours worked per person employed.

Figure 8.11

IMPACT OF PROPOSED BELL BAY PULP MILL — EMPLOYMENT



Source: CoPS. Note the above results are not cumulative impacts, but annual deviations from base case projections for Australian and Tasmanian employment levels. Results for Australia include the impact of the change in economic activity in Tasmania. See Section 8.5, Interpretation of modelling results.

Australia-wide (including Tasmania), employment would also be expected to see its greatest deviation in 2008. In this year around 1,100 additional jobs than would be expected in the base case. On average, during the operational phase of the mill, employment in Australia would be expected to increase by 284 jobs than would have otherwise been the case. By 2030, expansion by Australian businesses as a result of increased demand is expected to generate on net approximately 340 additional jobs more than what would have otherwise been expected (zero percentage deviation in terms of hours worked). The increase in employment Australia-wide is not as large as the expected increase in Tasmania (though Tasmania is included in the national results) because Tasmania is expected to draw

labour from other regions in Australia. This is based on the MMRF-Green assumption that national employment levels will not deviate from long run projections, but rather that regional and sectoral wages will adjust such that the economy adjusts to the most efficient industrial structure over time.

It should be noted that these are very high employment impacts relative to those commonly generated by CGE models. The labour market assumptions that underpin such modelling for major investment projects usually result in predictions that the project will have a negligible impact on the aggregate level of employment (i.e. less than one per cent) in the longer term, particularly at the national level. The fact that this project is projected to increase aggregate employment by approximately 2,000 jobs in Tasmania in the longer term is therefore very significant. This is due to the comparatively small size of the Tasmanian economy and labour market, the relative state of the Tasmanian economy to other regional economies, and the level of capital expected to be invested by Gunns.

Impact on the education, training and Australian skills base

The construction and operating phase workforces that will be hired to build and run the mill will be either semi-skilled (apprentice-grade) before they begin work at the mill. Construction phase workers would be expected to require training in construction, metal fabrication and electrical trades. Operating phase workers would require training in standard operating phase procedures and maintenance practices.

Northern Tasmania has a significant education and training capability. The University of Tasmania, TAFE Tasmania and a number of industry-specific research and training laboratories provide a unique base to further develop training for support to the proposed pulp mill. Training would occur both off-site and in the workplace.

During the construction phase, TAFE Tasmania would plan to focus on providing accelerated training programs so workers could be skilled up in particular aspects of construction, including:

- electrical cable tray installation;
- electrical termination;
- stainless steel welding;
- other specialised welding;
- targeted training in facets of building construction; and
- site health and safety requirements.

The construction phase courses, which could be held in Launceston, could also be open to the public (as well as to Gunns employees).

Through these courses, construction phase personnel would develop specific competencies, which could be converted into a full Australian Qualifications Framework (AQF) Certification Level 3 qualification. These accredited modules would be entirely transferable throughout Australia. The skilling of these workers during the mill's construction would lay the foundation for these persons to work across Australia in other positions. As a result of the mill process, more than 3,000 workers will be prepared to transfer new skills acquired at TAFE Tasmania to new

projects across Australia. Given the persistent gap between the demand for and supply of skilled labour in Australia, this represents an important skilling opportunity for Australia. For example, several NAB Business Surveys, including the NAB December Quarter Business Survey 2005, have shown that enterprise owners cite insufficient supplies of skilled labour to be a significant constraint on output. The December Survey also made explicit reference to the construction sector: ‘there are some sectoral hot spots, notably mining, construction and utilities’.⁵²

The construction phase training programs would be designed by TAFE Tasmania with input from Gunns to provide training that would accommodate time constraints and ensure access to semi-skilled construction personnel.

During the operational life of the mill, Gunns would intend to provide its staff with ongoing TAFE training courses. Again, most of the operational phase workers would also be expected to be generally inexperienced in pulp manufacture prior to working with Gunns. Of the 292 full-time jobs to be supported, Gunns would expect that more than 60 per cent of the jobs (both salaried and production line) would require additional technical training, in addition to on-site, mill-specific training. This would be likely to generate additional TAFE training opportunities (possibly as many as 6-8 new TAFE training positions in specific aspects of process engineering, plant supervisor, electrical equipment maintenance and material handling etc). These courses would be workplace-based and would include:

- ongoing trades training in electrical, fitting and turning, welding, instrumentation and other vocational skills;
- plant operator in standard operating procedures; and
- development of para-professionals in pulp manufacturing technology.

Significantly, TAFE Tasmania has entered into preliminary partnership discussions with the South Carelia Polytechnic Institute in Finland to access training expertise in pulp manufacturing technology that would be required if the mill were to go ahead. Initial discussions have been facilitated by Gunns as part of its management strategy for ensuring sufficient labour supplies are available in Tasmania during the construction phase. Collaboration with the South Carelia Polytechnic Institute would enable TAFE Tasmania to create best practice courses. This would streamline the course development process for TAFE Tasmania, transferring years of experience in wood manufacturing procedures and training to the Australian market.

From consultations with TAFE Tasmania, it is clear that the institution sees the opportunity for strong reputational benefits to be created through both the initial construction training courses and the ongoing standard operating procedure training if the mill is constructed. In particular, it sees potential for the creation of a centre of excellence at TAFE Tasmania around wood manufacturing technologies.

Impacts on government revenue and expenditure

Substantial additional government revenue would be generated at both a national and Tasmanian level, if the pulp mill goes ahead (Figure 8.12).

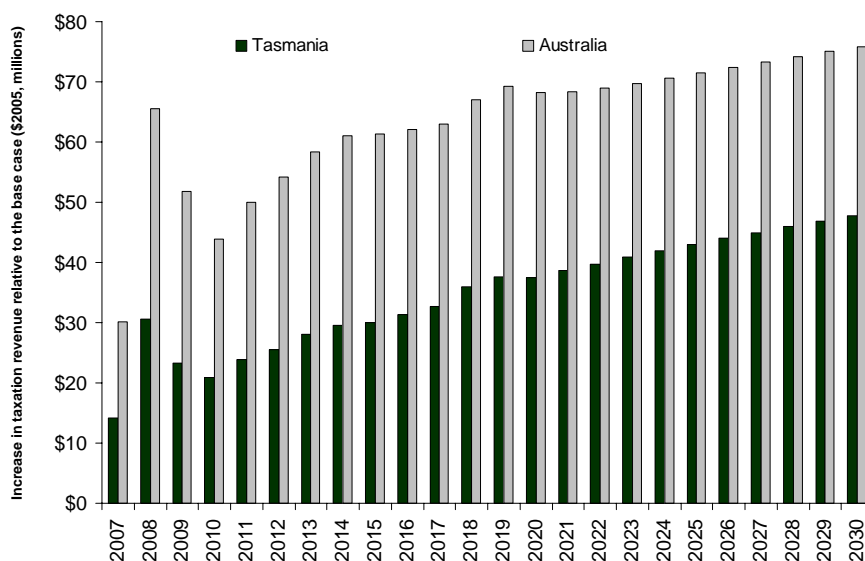
⁵² National Australia Bank, 2005, *National's Quarterly Business Survey: Q4, 2005*, p 3.

Tasmanian taxation revenues — which would include GST collected in Tasmania as well as relevant State taxes such as payroll tax and other local council taxes — is predicted to be \$48 million greater in 2030 than would otherwise have been the case.⁵³

In NPV_{5%} terms over the period 2007 to 2030, the sum of the annual increases in Tasmanian tax revenue as modelled by MMRF-Green are expected to amount to \$440 million.

Figure 8.12

IMPACT OF PROPOSED BELL BAY PULP MILL — GOVERNMENT REVENUE (\$2005, MILLIONS)



Source: CoPS. Note the above results are not cumulative impacts, but annual deviations from base case projections for Australian and Tasmanian investment levels. Results for Australia include the impact of the change in economic activity in Tasmania. See Section 8.5, Interpretation of modelling results.

All other tax revenue modelled by MMRF-Green — which would include national taxes such as company and income tax, as well as State taxes collected in States other than Tasmania — was forecast by MMRF-Green to be \$28 million higher in 2030 than would otherwise have been the case. Key drivers of this outcome include:

- a reduction in GST revenues collected in other states, reflecting the migration of economic activity to Tasmania.
- a reduction in state-based taxes in other states, reflecting the migration of economic activity to Tasmania.
- an increase in income taxes, reflecting the net-positive impact of the Tasmanian pulp mill on national outcomes; and
- an increase in corporate taxes, reflecting the net-positive impact of the Tasmanian pulp mill on national outcomes.

⁵³ The redistribution of GST revenues to Tasmania will be dependent on the Commonwealth Grants Commission formulae.

The increase in corporate and income taxes more than offset the reductions in other state GST and other tax revenues. In 2030, revenues from corporate and income taxes are expected to be \$46 million above base case projections, while revenues from other state GST and state-based taxes is expected to be \$18 million less than base case projections. In NPV_{5%} terms, the net growth in Commonwealth and other State taxes as modelled by MMRF-Green is expected to be \$393 million above base case expectations.

In total, taxation revenues to all Australian Governments are expected to increase by \$76 million above base case expectations by 2030. In NPV_{5%} terms, this would amount to an additional \$834 million in taxation revenue from 2007-2030 relative to the base case.

With regard to Government expenditures, no incentives from either the Tasmanian or Commonwealth Governments have been contracted, nor were any modelled in the MMRF-Green mill scenario. As nothing has been agreed with Government it is not possible to comment on the potential level of Government expenditure. This economic impact assessment is presented independent of any Government assistance, from either the State or the Commonwealth. However, Gunns has been in discussion with Governments with respect to support for common user, public benefit infrastructure aspects of the project, such as public roads and water infrastructure. Gunns has also benefited from Commonwealth Government R&D support with respect to the project, and the Commonwealth Government's Managed Investment Scheme (MIS). Through the MIS scheme, the Commonwealth has supported investment in plantations that will provide timber for this project.

In terms of other taxes and charges, Gunns expects to incur a once-off tax of \$120,566 for the purchase of additional land,⁵⁴ a once-off charge of \$158,850 for the purchase of Crown land⁵⁵ and \$780,000 per annum to Hydro Tasmania in water charges.⁵⁶

Regional impacts — gross regional product and employment

The Bell Bay Pulp mill would be the largest private sector investment seen in Tasmania and would generate strong employment growth. This section considers the distribution of the increase in economic performance across Tasmania's regions (Figure 8.13).

Most of the inputs for the operation of the mill are expected to be sourced within Tasmania. For example, during the operating phase:

- 100 per cent of the wood, gas, biofuels, water and effluent services, personnel and overhead inputs will be sourced from Tasmania; and
- 90 per cent of the operating, packaging and maintenance materials will be sourced from Tasmania;

There would also be strong growth in exports, with on average roughly 90 per cent of the pulp produced by the mill will be internationally exported with the remaining being sold to domestic markets.

⁵⁴ Jaakko Pöyry financial modeling.

⁵⁵ Jaakko Pöyry financial modeling.

⁵⁶ Jaakko Pöyry financial modeling.

Figure 8.13

TASMANIA'S REGIONS



Source: ABS, 2006, 1362.6 - Regional Statistics, Tasmania.

Because Tasmania is a relatively small economy, the economic impacts of the mill tend to be widely dispersed across the State. However the Northern region would be expected to see the greatest growth (Figure 8.14). The Northern region would be expected to see a peak in gross regional product (GRP) in 2030 of \$460 million above base case expectations (4.4 per cent).

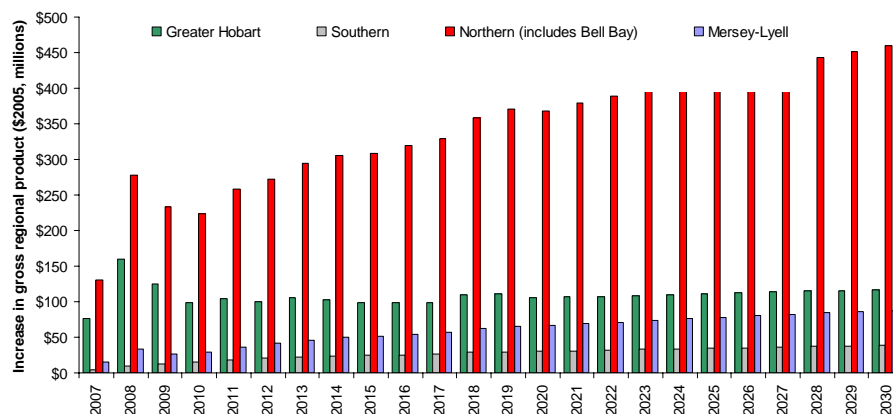
With the exception of the Northern region (which incorporates the mill itself and thus benefits most from the proposed development), the impacts would be reasonably similar in magnitude.

Greater Hobart would see the second greatest level of stimulation to its economy. This is due to the already existing industry in this region, which enables it to capture a greater proportion of the growth to the economy. The Greater Hobart region would be expected to expand strongly under the construction phase, peaking at an increase of \$160 million in GRP relative to base case assumptions in 2008 (3.1 per cent). It is also expected to see strong growth to 2030. In 2030, Greater Hobart's

GRP would be \$117 million (1.2 per cent) relative to the counterfactual where no mill is constructed.

Figure 8.14

IMPACT OF PROPOSED BELL BAY PULP MILL — REAL GROSS REGIONAL PRODUCT (\$2005, MILLIONS)



Source: CoPS. Note the above results are not cumulative impacts, but annual deviations from base case projections for regional GRP levels. See Section 8.5, Interpretation of modelling results.

The Southern and Mersey-Lyell regions are expected to see a modest increase over the base case. In 2030, the Southern regions’ GRP would be expected to be \$39 million greater than the base case (1.4 per cent). In 2030, the Mersey-Lyell region GRP is expected to be \$88 million greater than in the base case (1.1 per cent).

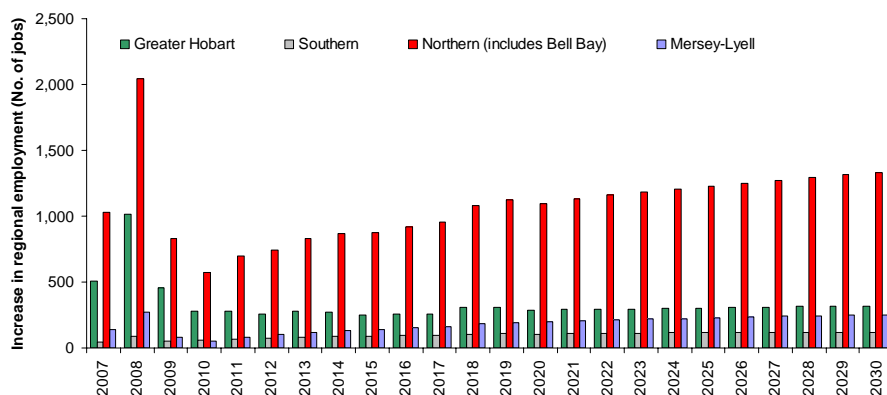
In terms of regional employment, Gunns estimates that the proposed mill, when operational, would provide an additional 292 full-time jobs. This would represent a substantial increase in full time employees in the area when compared with the current size of the labour force in the area. In total, this would provide an estimated increase of approximately 1,617 jobs in Tasmania on average during the operational life of the mill. During the construction phase and the operational life of the mill, the Northern Region would see the greatest increase in employment levels, followed by Greater Hobart (Figure 8.15).

- *Northern Tasmanian employment impacts* — In 2008, the Northern region would see an expected increase of 2,046 jobs (9.2 per cent increase in total hours worked) relative to the base case. In 2030, the Northern region would see an expected increase of 1,332 jobs (4.4 per cent increase in total hours worked) relative to the base case.
- *Greater Hobart employment impacts* — In 2008, the Greater Hobart region would see an expected increase of 1,015 jobs (3.1 per cent increase in total hours worked) relative to the base case. In 2030, the Greater Hobart region would see an expected increase of 319 jobs (0.7 per cent in terms of total hours worked) relative to the base case.
- *Southern Tasmanian employment impacts* — In 2008, the Southern region would see an expected increase of 85 jobs (1.5 per cent increase in total hours worked) relative to the base case. In 2030, the Southern region would see an expected increase of 120 jobs (1.2 per cent) relative to the base case.

- Mersey-Lyell employment impacts* — In 2008, the Mersey-Lyell region would see an expected increase of 275 jobs (1.5 per cent increase in total hours worked) relative to the base case. In 2030, the Mersey-Lyell region would see an expected increase of 252 jobs (0.8 per cent increase in total hours worked) relative to the base case.

Figure 8.15

IMPACT OF PROPOSED BELL BAY PULP MILL — REGIONAL EMPLOYMENT



Source: CoPS. Note the above results are not cumulative impacts, but annual deviations from base case projections for regional employment levels. See Section 8.5, Interpretation of modelling results.

Industry impacts

This section discusses industry sector impacts. Gunns has a stated goal to source inputs and services (both at construction and for the life of the project) from within Tasmania first. Of course the greatest industry impacts would be the creation of the pulp industry and the contraction of the woodchip industry. The value of the pulp industry’s development is captured by the expected growth in Tasmania’s exports. In 2030, the value of exports from Tasmania would be expected to rise to \$204 million above base case expectations. In NPV_{5%} terms over the operating phase,⁵⁷ this would be \$2.3 billion dollars greater than base case projections.

The proposed mill would also result in material growth in several other Tasmanian industries, including:

- the Tasmanian construction sector;
- the Tasmanian basic chemicals sector;
- the Tasmanian biomass sector;
- the Tasmanian trade and accommodation sector;
- the Tasmanian road freight and private sectors; and
- the Tasmanian home ownership sector.

⁵⁷ The operating phase of the mine was assumed to begin in 2009 and run to 2030.

The construction of the mill does not have a material effect on any other industry, with the exception of the wood chipping industry, which sees a contraction in line with the output that is now diverted into the new pulp industry. Again this growth in Tasmanian industry would be expected to ‘crowd out’ economic activity in other states. Thus Australian industry impacts tend to be driven by Tasmania’s industry growth profile.

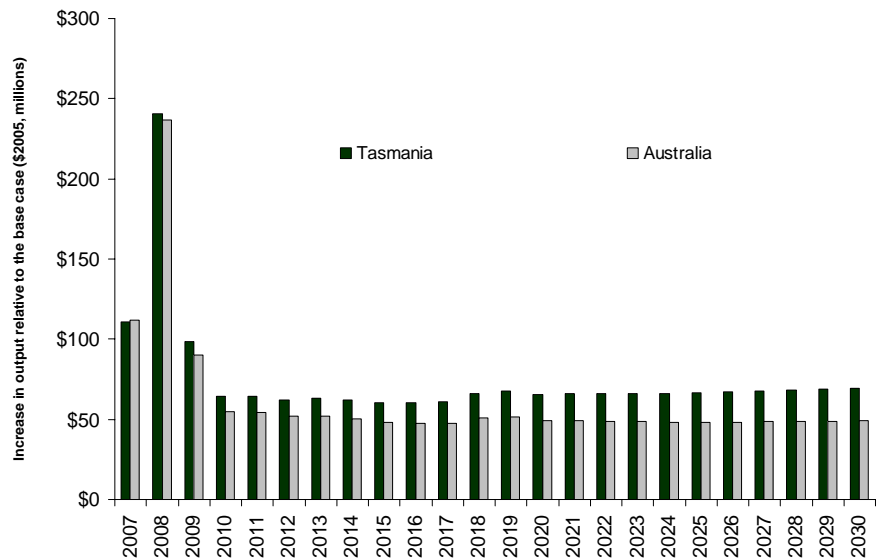
Modelling results for all sectors can be made available by Gunns by request.

Construction services

The construction sector would receive a major boost from the development of the pulp mill, both because of the additional activity in the sector during the construction phase, and because of the on-going activity generated as the economy is stimulated by activity at the mill. The nature of this impact of the pulp mill on the construction industry, both nationally and in Tasmania, is shown in Figure 8.16 and Figure 8.17 below.

Figure 8.16

IMPACT OF BELL BAY MILL — CONSTRUCTION INDUSTRY OUTPUT (\$2005, MILLIONS)



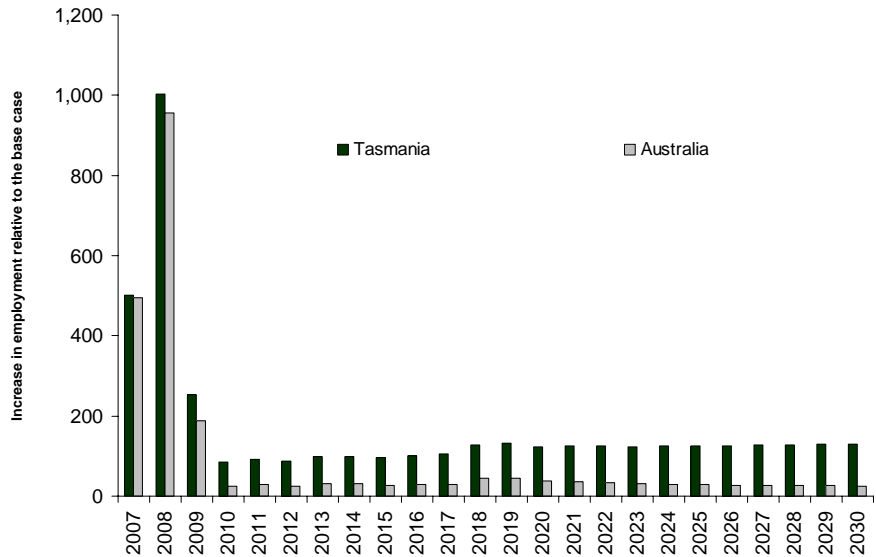
Source: CoPS. Note the above results are not cumulative impacts, but annual deviations from base case projections for Australian and Tasmanian construction industry real value added levels. Results for Australia include the impact of the change in economic activity in Tasmania. See Section 8.5, Interpretation of modelling results.

In Tasmania, real value added in the construction sector relative to the base case would peak at around \$241 million in 2008 (12.5 per cent), and would remain at about \$69 million in 2030 (2.3 per cent). In the Tasmanian construction sector, there would be over 1,000 more jobs than in the base case during the construction phase (2008). This would represent a 19.0 per cent expansion in Tasmanian construction sector employment. In 2030, Tasmanian construction would remain at around 130 additional jobs (2.3 per cent increase in total hours worked).

Nationally, the impacts would be smaller, particularly once the construction phase is over. In 2008, output by the construction sector would be \$237 million greater than in the base case (0.3 per cent). The boost to value added in 2030 relative to base would be around \$49 million (0.1 per cent) with a negligible impact on employment.

Figure 8.17

IMPACT OF BELL BAY PULP MILL — CONSTRUCTION INDUSTRY EMPLOYMENT



Source: CoPS. Note the above results are not cumulative impacts, but annual deviations from base case projections for Australian and Tasmanian construction industry employment levels. Results for Australia include the impact of the change in economic activity in Tasmania. See Section 8.5, Interpretation of modelling results.

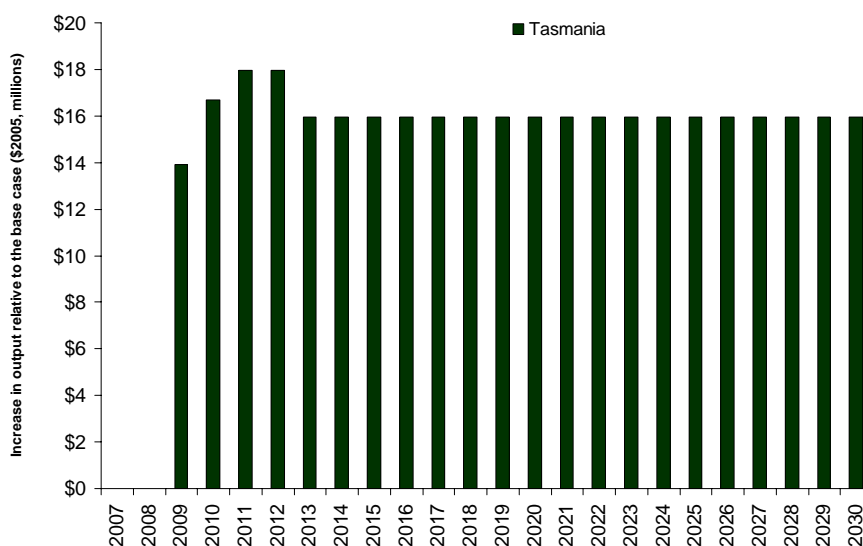
Biomass sector

The biomass sector, which is the term applied to describe the generation of energy from any organic, non-fossil material (in this case forestry waste), expands in line with the assumptions about the generation of electricity at the pulp mill. Of the energy that is sold to the NEM, approximately 80 per cent would be generated as a result of the pulping production process and 20 per cent as a result of biomass projects.

During the operational phase of the project, the Tasmanian biomass sector would be expected to expand by \$15.9 million in the long run (approximately 256 per cent increase over operational phase base case levels). Figure 8.18 shows the increase in industry output expected. Employment in this sector would also see some growth from a small base. In 2030, an additional 14 persons would be expected to be employed in the sector.

Figure 8.18

IMPACT OF PROPOSED BELL BAY PULP MILL — BIOMASS OUTPUT (\$2005, MILLIONS)



Source: CoPS. Note the above results are not cumulative impacts, but annual deviations from base case projections for Tasmanian biomass industry output levels. See Section 8.5, Interpretation of modelling results.

Local and regional road transport services

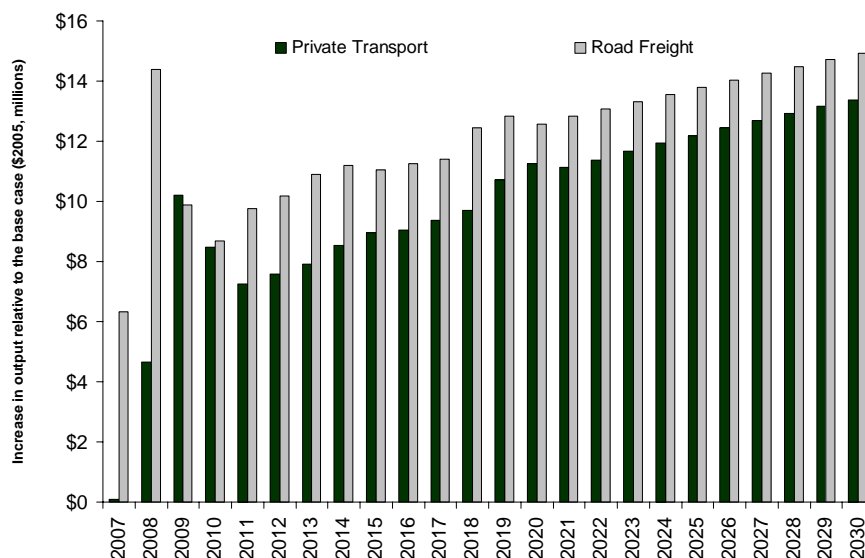
The import of key inputs to the pulp mill operations (in terms of wood product, liquid, fuel, chemicals, packaging materials, operating equipment maintenance items) and the export of the final product will have significant economic spin-offs for the transport supply chain and shipping sub-sectors of the Northern Tasmanian economy. The role of land transport (rail and road) is expected to be critical to the operations of the pulp mill in terms of the transport/logistics of supplying logs to the proposed mill. *Detailed transport planning and logistics flow modelling has been completed and results have been reported in Section 6 of the IIS. The MMRF-model provides an estimate of the aggregate growth of the economy on demand for transport services.* It is recommended that the reader review the *Transport and Traffic Impact Assessment Report* prepared by GHD, in parallel with the economic impact assessment, for additional details relating to existing site conditions, Gunns’ *State Resource Regions and Zones*, and details of the road and rail freight forecasts provide additional analysis to this report. Of particular relevance to the economic impact assessment has been the estimation of the current and future log truck movements, with and without rail utilization, under alternative mill development scenarios.

Although Gunns will utilise the rail network to transport materials, Tasmania’s land transport task is expected to grow in road freight. The road transport sector will benefit from the mill’s operating cost expenditures. In terms of the MMRF-Green road transport results, the model expects the road freight and private transport services industries to see strong growth (Figure 8.19). In 2008, the output of Tasmanian road freight sector would be \$14 million greater (3.7 per cent). Although demand for road freight is expected to dip after the end of the construction phase,

the long run growth is expected to again stimulate demand such that by 2030, the output of the sector is expected to be \$15 million above base case expectations (2.3 per cent).

Figure 8.19

IMPACT OF PROPOSED BELL BAY PULP MILL — TRANSPORT REAL VALUE-ADDED (\$2005, MILLIONS)



Source: CoPS. Note the above results are not cumulative impacts, but annual deviations from base case projections for Tasmanian private transport and road freight output levels. See Section 8.5, Interpretation of modelling results.

Similarly the Tasmania private road transport services sector would also be expected to grow if the mill is constructed. In 2009, the output of Tasmanian private road transport sector would be \$10 million greater (2.6 per cent). In 2030, the output of the sector is expected to be \$13 million above base case expectations (2.6 per cent).

Employment in the road freight sector is expected to increase by 2.3 per cent in the long run in terms of total hours worked, after peaking by 6.7 per cent in 2008. This translates to an expected 66 jobs in 2008 and an expected 29 jobs in 2030. Employment in the passenger transport services sector is not expected to see a substantial change.

Forestry

Forestry on private land is widely accepted as a profitable form of intensive agriculture. Private forests, since 1945, have provided increasingly higher levels of hardwood sawlog than state-managed native forests. Private forests are an important source of wood supply to Gunns existing facilities. Gunns currently pays a market royalty for plantation and native forest pulpwood from across Tasmania. Projections of private forest resource availability into the future have been analysed in detail in *Volume 1 – Section 6.2 Pulpwood Supply* of the IIS. These projections indicate the significant part that the Private Forest Estate will have to play in supplying resource to the proposed pulp mill.

The proposed mill will provide added security to private forest growers and managers, and ensure that the preferred Australian market for private forests is within Tasmania. Clause 74 of the Tasmanian Regional Forest Agreement provided for the “active encouragement of the development of downstream processing in Tasmania such that the preferred market for growers is within the State”. The proposed mill supports this objective.

The harvesting of pulpwood from private lands will also provide for better management of the Private Forest Estate, for example, the development of property management plans and the identification and protection of significant biological diversity values as part of the planning process. This will promote the conservation and management of the Private Forest Estate, another objective of the Tasmanian Regional Forest Agreement.

Private forestry will emerge as a highly significant economic activity for Tasmania’s rural sector. It will provide a range of significant economic benefits, including:

- diversity of agricultural income (less direct dependency on dairying, cattle and wool production);
- medium-long term land values for farms to be sustained (important source of agricultural income/superannuation support);
- ensuring that cash flows can be sustained as the forestry resources are sold to Gunns for pulping at the proposed mill (a secure source of income);
- limiting the extent to which rural property owners will require on-farm labour, and the need to live permanently on-farm (particularly important for aging owners);
- providing new rural employment opportunities for contractor-style forest planting, pruning/thinning and harvesting;
- allowing for continued development of tree seedling/nursery production to support the plantations; and
- providing a sustainable resource for the timber furniture and wood product sectors (important downstream or indirect manufacturing effects).

It is expected that additional value-adding economic activity may be stimulated as a result of the proposed pulp mill providing added security for the Private Forest Estate, including particleboard, MDF (medium density fibre board), paper mills, specialty building materials (laminated beams/trusses, flooring products) and furniture manufacture.

In terms of the intensification of the establishment of plantations in Tasmania to supply this increasing plantation supply to the mill, no additional intensification outside of the current Gunns owned or managed planting levels is envisaged or required as a result of the pulp mill development.

Gunns’ plantation estate (on land owned or managed by Gunns) has grown at a rate of approximately 10,000ha per year for the past five years. The resource analysis undertaken for the purpose of the pulp mill was based upon a total Gunns plantation estate of 150,000ha being achieved in approximately 10 years time (consistent with Gunns current business strategy for a 150,000ha plantation estate within Tasmania) equating to a growth of less than 10,000ha per year.

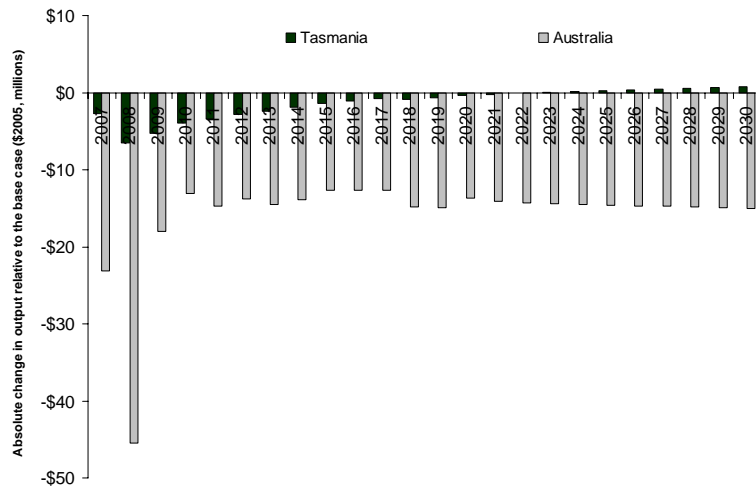
Based on these predictions and the planned growth of Gunns’ plantation estate, the current trend to develop hardwood and softwood plantations could be expected to continue, with no increase in intensification required as a result of the pulp mill. The necessary growth in plantation development in Tasmania to underpin potential resource for the pulp mill is less than the inherent growth already occurring within the industry. No impact in terms of 'crowding out' on the agricultural industry is predicted as a result of the pulp mill development. Further analysis of this is provided in the Pulpwood Supply chapter of the IIS.

Agriculture

The agriculture sector is expected to see a slight contraction due to the appreciation of the Australian dollar. This is true both in Australian and Tasmania (Figure 8.20). This is again due to an initial capital funding shock to the model in 2007-2009 and the long run increase in net exports. In 2030 Australian agricultural output is expected to have contracted by \$15 million; this does not represent a statistically significant change in output (zero percentage deviation). The change in output in 2008 represents only a 0.2 per cent deviation from base case expectations. Tasmanian agricultural output is expected to grow be effectively the same as base case expectations in 2030, with a \$1 million increase in output expected (zero percentage deviation). The peak deviation is expected in Tasmania in 2008 at 0.9 per cent.

Figure 8.20

IMPACT OF PROPOSED BELL BAY PULP MILL — AGRICULTURE OUTPUT (\$2005, MILLIONS)



Source: CoPS. Note the above results are not cumulative impacts, but annual deviations from base case projections. See Section 8.5, Interpretation of modelling results.

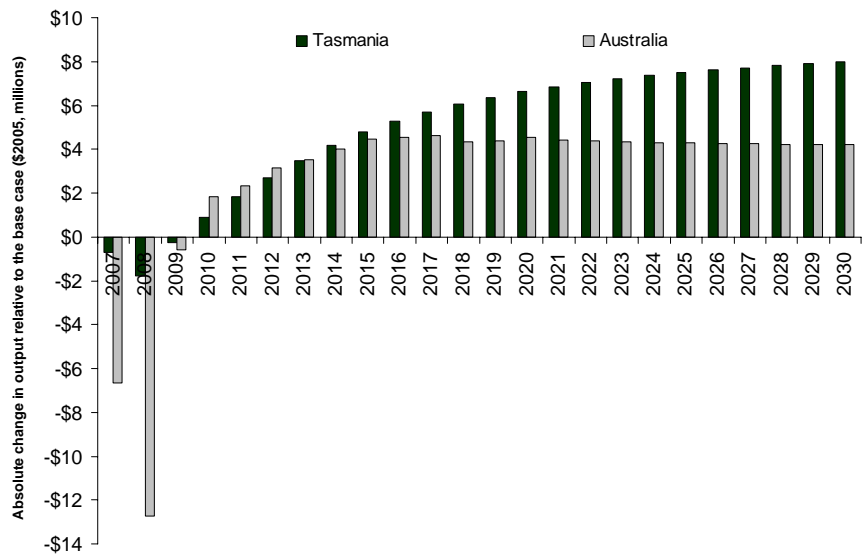
The impact on employment however is very small. No change is expected in agricultural employment levels. This reflects the small percentage change in output levels.

Chemicals

The chemicals sector, like the agricultural sector, is expected to see an initial contraction due to the appreciation of the Australian dollar (Figure 8.21). This is again due to an initial capital funding shock to the model in 2007-2009. However because the mill was modelled to create a chemicals production industry in Tasmania (at the plant) in the long run the sourcing of chemicals for pulp production lead to expansions in both the Tasmanian and Australian basic chemicals industries. Tasmanian basic chemicals output is expected to grow to \$8 million above base case expectations by 2030 (4.1 per cent). Australian basic chemicals output is expected to grow to \$4 million above base case expectations by 2030 (zero percentage deviation).

Figure 8.21

IMPACT OF PROPOSED BELL BAY PULP MILL — CHEMICALS OUTPUT (\$2005, MILLIONS)



Source: CoPS. Note the above results are not cumulative impacts, but annual deviations from base case projections. See Section 8.5, Interpretation of modelling results.

The impact on employment is not expected to result in a change at the national level; however, employment in the sector is expected to expand by 4.2 per cent in Tasmania in terms of total hours worked. This was expected to translate into an additional 14 jobs.

Marine and freshwater fishing industries

The MMRF-Green model did not predict any change in the output of fishery industries. Additional discussions regarding environmental management have been provided elsewhere in the IIS.

Impact on trade and accommodation

The proposed construction period from 2007-2009 would result in significant short-term construction employment.⁵⁸ This would result in a significant increase in the demand for workforce accommodation. Various forms will be possible including rental of existing vacant housing in George Town, the Bell Bay environs, in the Scottsdale/Bridport areas and in Launceston and its environs. Hotel/motel accommodation would be highly desirable; with occupancy levels likely to significantly increase, particularly in off season/winter months. This would represent an important additional form of tourism sector income. It is expected that with such short-term employment there would be investment in additional restaurant/bar/entertainment facilities. By analogy, the major re-development of Gladstone refinery capability, in the late 1990's, led to a major expansion in the city's entertainment facilities.⁵⁹

Moreover, the 'Giants of Industry Tour' was reported by the Gladstone Visitors Centre to net 15 to 20 persons on average per week.⁶⁰ In annual terms this translates into roughly 780 to 1040 industrial tourists each year. Similarly, 'industrial' tourism is a strong tourism theme in many European cities. Additional industrial tourism to Launceston and George Town could reasonably be expected to eventuate if the mill is constructed. Launceston is an important tourist destination for mainland and overseas tourists, as well as for Tasmanians. For example, the Cataract Gorge is the fourth most popular tourist site in Tasmania (approximately 260,000 visitors in 2004). Day visits/tours to the Mill would be envisaged. The technical uniqueness/significance of this state-of-the-art complex would be recognized widely. It can be assumed that drive-by visits will be a key element of visitation to the Tamar Valley.

This important new form of industrial tourism would lead to a further stimulation of tourism and outdoor recreation activities in the Tamar Valley. The wine tours would be strengthened; additional restaurant/café demand could be expected; new forms of tourist accommodation and food/beverage outlets would also be encouraged. Additional tourism employment opportunities could also be expected. The seasonal downturn/seasonal impact of employment may be reduced, for the autumn/winter months.

Moreover, during construction, the impact of construction salaries on the local area economy of Bell Bay is expected to be significant. Expenditures on food, entertainment, clothes, health services, motor vehicles, air travel would generate significant additional retailing and services income, employment and investment stimulus. At the peak of planned construction, monthly expenditure by the construction workforce could be upwards of \$3,250,000.⁶¹ This could translate to an annual injection of more than \$39 million in additional spending in the local economy (excluding expenditure on accommodation and air travel) by the pulp mill construction force alone. Following commissioning of the mill, it is expected that an additional workforce of 292 full-time employees would be sustained over the life of the mill's operations. This would be expected to result in significant additional

⁵⁸ This is based on financial analysis by Jaakko Pöyry. This may be supplied on request, on a commercial in confidence basis.

⁵⁹ See Gladstone www.gladstoneregion.org.au for examples of facilities available.

⁶⁰ Interview on 11 May 2006.

⁶¹ This is based on an assumption of average post-tax weekly earnings of \$650 for all 2,500 workers in 2009. It was further assumed that workers spent half their weekly earnings in the region.

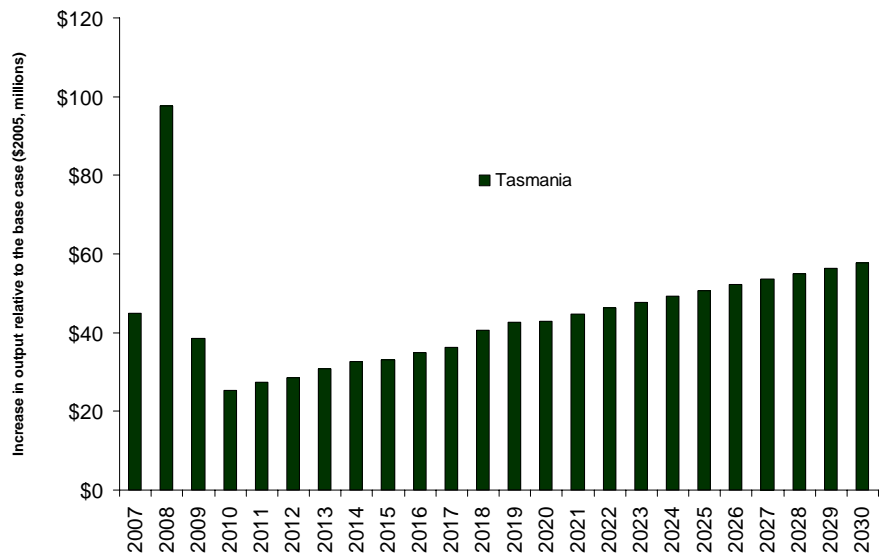
retailing, services and housing expenditures in the principal urban centres of George Town, Launceston and in the surrounding rural communities.

Moreover, new housing and the purchase of the existing housing stocks would represent a significant local area residential impact. Retailing and services functions would be likely to expand in range and quality to meet the additional professional and technical workforce. The small number of overseas employees would also result in a further diversity of retailing and service opportunities for the local area economy. However, Gunns also intends, if the mill is constructed, to implement a management plan for limiting the potentially negative impact of the influx of persons into the Georgetown precinct (an artificial accommodation industry boom). Gunns has planned for the construction of accommodation facilities to house up to 800 workers. This will smooth the transition for the accommodation industry into and out of the construction phase of the mill.

MMRF-Green modelling projects the output of the trade and accommodation sector to expand by \$98 million in 2008 relative to base case expectations (3.7 per cent). In 2030, the output of the trade and accommodation services sector is expected to increase by \$58 million over the counterfactual scenario where no mill is constructed (1.4 cent). Figure 8.22 shows the expected impact on the trade and accommodation sector as a result of the mill’s construction.

Figure 8.22

IMPACT OF PROPOSED BELL BAY PULP MILL — TRADE AND ACCOMMODATION OUTPUT (\$2005, MILLIONS)



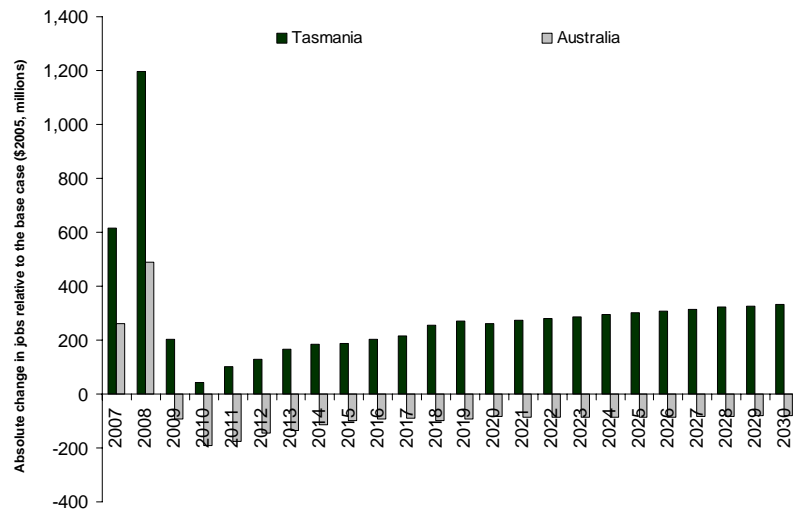
Source: CoPS. Note the above results are not cumulative impacts, but annual deviations from base case projections for Tasmanian trade and accommodation industry output levels. See Section 8.5, Interpretation of modelling results.

In terms of labour availability to service this industry expansion, the model projects that an additional 1,200 persons (6.1 per cent increase in total hours worked) would be required in the trade and accommodation sector to meet the additional demand in 2008. Over time, this is expected to attenuate and in the long run 300 additional jobs would be created in Tasmania (Figure 8.23). This represents a 1.3 per cent

increase in terms of total hours worked over base case levels where a mill would not be constructed. The model projects that much of this labour will come from the mainland, attracted by higher wages. The model projects that in the longer run there will be a sustained migration of persons to Tasmania. Australia’s trade and accommodation sector is projected to see employment fall by 80 persons relative to the base case (zero percentage deviation in terms of total hours worked).

Figure 8.23

IMPACT OF PROPOSED BELL BAY PULP MILL — TRADE AND ACCOMMODATION EMPLOYMENT



Source: CoPS. Note the above results are not cumulative impacts, but annual deviations from base case projections for Tasmanian trade and accommodation industry output levels. See Section 8.5, Interpretation of modelling results.

Home ownership, impact on land values

Impact on local house prices and land prices (undeveloped) in the area of influence of the mill are expected to be positive. Gunns research with relevant real estate industry personnel in the George Town, Bell Bay, Tamar Valley, Launceston, and Bridport areas have indicated that there was a minor increase in house prices and in land values (10 per cent) after the proposed mill concept was announced. With the timing of commencement of the proposed mill, it is anticipated that additional land and property price increases would occur (less than 15 per cent). However, Gunns has assessed that it is unlikely that the distribution of impacts would adversely affect the proposed mill; stakeholders expect key beneficiaries would be the existing land/property owners. Gunns has assessed that no particular community group will be made worse off.⁶² Gunns research indicates that it is likely that new property acquisition in the George Town and Launceston urban areas would be achieved incrementally during the first six months of construction. New house construction is not expected until later in the project’s construction. Hence, land price escalation will be modest.

⁶² Additional assessments of environmental impacts are provided elsewhere in this IIS.

The MMRF-Green model projects ownership of dwellings in Tasmania to gradually increase over the life of the mill, such that the value of the stock of Tasmanian home ownership would be expected to increase by 2.4 per cent relative to base case projections by 2030.

Impact on information technology sectors

The processed pulp mill will be highly IT intensive. New software/process technology applications will be involved at all sections of the mill line and its process control points. This will require IT support and process technology support, as part of the necessary operations and maintenance functions, on a daily basis.

This will also require IT training and support personnel. It is expected that this will create full-time IT jobs as new process technology leads to retrofitting or plant modifications to other wood products/paper processing plants.⁶³ An independent/second order investment in a new paper mill would also require and generate IT and process engineering technology demand. Further impetus to Tasmania's IT initiative, *Intelligent Island*, to stimulate Tasmania's ICT industries is also recognised in relation to additional employment and investment in new software and R&D applications involving IT.

8.7 Summary of impacts

Table 8.5 summarises the key quantitative impacts as assessed by the MMRF-Green model. All impacts for all other industries have been supplied in Appendix C.

⁶³

This is based on consultations with industry by Gunns. See Appendix A for a list of consulted parties.

Table 8.5

SUMMARY OF KEY ECONOMIC IMPACTS

Measure	Impact of Bell Bay mill (2007-2030) ^a	Percentage growth above base case projections in 2030
NPV ^b of Gross Domestic (State) Product impacts (\$billion) ^c		
Australia	\$3.8 billion	+0.03%
Tasmania	\$6.7 billion	+2.5%
NPV of investment impacts (\$billion)		
Australia	\$2.3 billion	+0.02%
Tasmania	\$3.1 billion	+2.2%
NPV of consumption impacts (\$billion)		
Australia	\$2.7 billion	+0.04%
Tasmania	\$3.3 billion	+2.6%
Average annual construction phase employment impacts ^d		
Australia	696 persons	-
Tasmania	2187 persons	-
Greater Hobart	659 persons	-
Southern	60 persons	-
Northern	1303 persons	-
Mersey-Lyell	164 persons	-
Average annual operating phase employment impacts ^e		
Australia	+284 persons	0.0% ^g
Tasmania	+1,617 persons	+2.0%
Greater Hobart	+297 persons	+0.7%
Southern	+98 persons	+1.2%
Northern	+1,044 persons	+4.4%
Mersey-Lyell	+177 persons	+0.8%
Tasmanian industry impacts (\$million)		
Construction	\$1,125 million	+2.3%
Trade and accommodation	\$601 million	+1.3%
Biomass	\$192 million	+206.3%
Road transport – freight	\$160 million	+2.3%
Private transport	\$124 million	+2.6%
Chemicals	\$8 million	4.1%
Agriculture	\$1 million	0.0%

Note ^a: All results are presented relative to a base case where no new pulp mill investment is made. Note ^b: NPV calculations are taken over the 2007-2030 period, discounted at a real social discount rate of five per cent. The Net Present Value, or NPV, of an investment or stream of cash flows quantifies the present value of future revenues and expected costs associated with the investment. This is premised on the concept of the 'time value of money': generally cash is worth less tomorrow than it is today. To determine the present value of a project or investment, future cash outlays or revenues are discounted back at a social discount rate of five per cent. Discounting cash flows enables decision makers to compare different investments on a like-for-like (present value) basis. The selection of this rate (five per cent) was based on the assessment that the returns would be expected to occur if the mill were to be constructed, making the notional rate of 'risk free' government bonds the appropriate 'next best alternative' investment. This reflects the opportunity cost of capital. Note ^c: All impacts, except employment, are in constant (\$2005) prices. Note ^d: Construction phase employment impacts are presented as average annual increases over

2007-2009. Note ^e: Operational phase employment impacts are presented as average annual increases over operational life of the mill (2009-2030). Note ^f: The mill will have an operational life of 30 years (2007-2039). Financial modelling was conducted by Jaakko Pöyry separate to the preparation of this chapter. The results presented in Section 8.6 are based on computable general equilibrium modelling (which is based on the financial projections but separate from their development). The economic modelling results were not projected past 2030 due to concerns for increasing uncertainty of outcomes over long time frames. Note ^g: Note that this is an increase in the time (hours) that persons are employed, which is slightly different to the number of persons employed (which is shown in the column to the left). The MMRF-Green model assumes that employed persons become more productive. Thus the increase in hours is assumed to be met by a combination of an increase in the number of jobs and an increase in the number of hours worked per person employed.

8.8 Impact of the project not proceeding

The analysis contained in this Chapter shows that the proposed pulp mill would have a very substantial positive impact on Tasmania's economy. It would raise the level of investment in Tasmania, which is essential if economic growth is to be lifted and living standards improved. It would show the way in raising the State's production and export profiles away from commodities and simply transformed manufactures and into more sophisticated, value-adding products. It would permanently create approximately 2,000 more jobs in the Tasmanian economy (by 2030), many of them in higher value occupations. All these impacts are encapsulated in the pulp mill's projected highly positive impact on Tasmania's GSP, with a NPV of around \$6.7 billion, equivalent to around half of the State's current annual GSP.

If the project were not to occur, none of these social and economic benefits would be realised. Tasmania's employment profile would roughly similar to current rates and trends, as Gunns would continue to produce forest and wood products as it currently does. There would not be the stimulus provided to Tasmanian industry and economic growth because there would not be additional activity or a change from the status quo. Tasmanians would need to look to other industries to sustain their future living standards. After a negative experience with this project and the previous decision on Wesley Vale, it would seem very unlikely that any other investor would develop a major investment proposal in this industry again. The prospects of adding value to Tasmania's greatest natural resource would therefore appear limited.

In the event that the project does not go ahead, it may well be that the present gap between living standards in Tasmania and on the mainland would again widen over time. Tasmania remains a small and open economy. Adding value to its principal natural resource, in a responsible and ecologically sustainable way, would offer a pathway to building continued economic growth. While other industries, such as tourism, will continue to develop, they do not offer such a potential for wealth creation and the ability to sustainably increase living standards. While Tasmania may have some advantages in other high value activities, due to the skills of its workforce, it will be difficult to attract investment in many of these areas in competition with States such as Victoria and New South Wales. As in the past with call centres, other businesses may be attracted to Tasmania because of its lower labour costs, but this approach is unlikely to increase economic growth and living standards.

Moreover, there would be no change in the volume of forest harvested. Gunns' harvesting strategy is independent of the decision to process the wood downstream.

Clearly, the success of the pulp mill project represents a significant opportunity for value-adding activity that will provide long run growth for Tasmania.

Appendix A

List of Key Organisations and Personnel Interviewed

A.1 Hobart

Pulp mill Taskforce – D. Tomat
Forestry Tasmania – D. Stringer
Dep't. of Economic Development – R. Edwards, M. Sayer
Dep't. of Infrastructure, Energy and Resources – S. Dobie
Tourism Tasmania – R. Sproule
University of Tasmania – B. Felmingham

A.2 Launceston

Dep't. of Economic Development – T. Black
Launceston Chamber of Commerce – J. Archer
Launceston City Council – I. Abernethy
Northern Tasmania Development – M. Topper
Area Consultative Committee, Tasmania – C. Perkins
Forests Industries Association – T. Edwards
Industry Capability Network, Tasmania – G. Templeton
Tasmanian Farmers and Graziers Association – G. Bradfield
TAFE Tasmania – M. White

A.3 Bell Bay

Port of Launceston Authority – C. Black

A.4 George Town

George Town Council – J. Ayers
George Town Chamber of Commerce – T. Cory
First National Real Estate – D. Gumley

A.5 Scotsdale

Dorset Council – G. Preece
Frenchpine – S. Anthony

A.6 Burnie

Private Forests Tasmania – A. Warner

Appendix B

The MMRF-Green Model

B.1 Model overview and enhancements

The MONASH suite of CGE models have a lengthy history of development. They are the most comprehensive models available in Australia, are extensively documented and have been subject to comprehensive peer review. They have a very high level of credibility among governments, academics and other expert bodies.

MMRF-Green is a very detailed dynamic, multi-sectoral, multi-regional model of Australia. The current version of the model distinguishes 54 industries, 58 products, eight States/territories and 56 sub-State regions.

MMRF-Green is founded on the Monash Multi-Regional (MMR) model, and was built in three stages. In the first stage, MMR was transformed into a dynamic system by the inclusion of dynamic mechanisms. These were added as self-contained blocks, allowing MMRF-Green to include MMR as a special case. The second stage involved a range of developments designed to enhance the model's capacity for environmental analysis. In the third stage, a regional disaggregation facility was added, which allows state-level results to be disaggregated down to sub-state regions.

MMR

MMR divides Australia into the six states and two territories. There are five types of agents in the model: industries, capital creators, households, governments, and foreigners. The number of industries is limited by computational constraints. For each industry in each region there is an associated capital creator. The sectors each produce a single commodity and the capital creators each produce units of capital that are specific to the associated sector. Each region in MMR has a single household and a regional government. There is also a federal government. Finally, there are foreigners, whose behaviour is summarised by export demand curves for the products of each region and by supply curves for international imports to each region.

MMR determines regional supplies and demands of commodities through optimising behaviour of agents in competitive markets. Optimising behaviour also determines industry demands for labour and capital. Labour supply at the national level is determined by demographic factors, while national capital supply responds to rates of return. Labour and capital can cross regional borders so that each region's stock of productive resources reflects regional employment opportunities and relative rates of return.

The specifications of supply and demand behaviour co-ordinated through market clearing equations comprise the general equilibrium (GE) core of the model. There are two blocks of equations in addition to the core. They describe regional and federal government finances and regional labour markets.

From MMR to MMRF-Green: dynamics

There are two main types of inter-temporal links incorporated into MMRF-Green: physical capital accumulation and lagged adjustment processes. These are explained below.

Physical capital accumulation

It is assumed that investment undertaken in year t becomes operational at the start of year $t+1$. Thus, given a starting point value for capital in $t=0$, and with a mechanism for explaining investment through time, the model can be used to trace out the time paths of industry capital stocks.

Investment in industry i in state/territory s in year t is explained via a mechanism that relates investment to expected rates of return. The expected rate of return in year t can be specified in a variety of ways. In MMRF-Green two possibilities are allowed for, static expectations and forward-looking model-consistent expectations. Under static expectations, it is assumed that investors take account only of current rentals and asset prices when forming current expectations about rates of return. Under rational expectations the expected rate of return is set equal to the present value in year t of investing \$1 in industry i in region r , taking account of both the rental earnings and depreciated asset value of this investment in year $t+1$ as calculated in the model.

Lagged adjustment processes

One lagged adjustment process is included in MMRF-Green. This relates to the operation of the labour market in year-to-year policy simulations.

In comparative static analysis, one of the following two assumptions is made about the national real wage rate and national employment:

- the national real wage rate adjusts so that any policy shock has no effect on aggregate employment; or
- the national real wage rate is unaffected by the shock and employment adjusts.

MMRF-Green's treatment of the labour market allows for a third, intermediate position, in which real wages can be sticky in the short-run but flexible in the long-run and employment can be flexible in the short-run but sticky in the long-run. For year-to-year policy simulations, it is assumed that the deviation in the national real wage rate increases through time in proportion to the deviation in aggregate employment from its base case-forecast level. The coefficient of adjustment is chosen so that the employment effects of a shock are largely eliminated after about ten years. This is consistent with macroeconomic modelling in which the NAIRU⁶⁴ is exogenous.

⁶⁴ The term NAIRU is an acronym for Non-Accelerating Inflation Rate of Unemployment, sometimes referred to as the long run 'natural rate of unemployment'. At this level it is assumed that the economy is at 'full employment'. It is assumed that if actual unemployment falls below the NAIRU, the inflation rate is likely to rise quickly (accelerate).

B.2 Closure assumptions

Supply-side structure

The standard MMRF-Green treatment of input-structure applies to all industries, including the three new industries representing the core elements of the Project. Capital and agricultural land is assumed to be industry specific, while there is only one type of labour employed by all industries in all regions. There is no explicit allowance for natural-resource as a fixed factor of production. The primary-factor substitution elasticity is set to 0.5 for all industries. Trade elasticities for international and interstate imports and exports are available on request.

Labour markets

At the national level, we assume that the deviation in the national real wage rate from its base case level increases in proportion to the deviation in economy-wide employment from its base case level. Eventually, the real wage adjustment eliminates the deviation in national employment. Thus in the long-run the national labour-market impacts of the Project will be revealed as changes in the national real wage rate, rather than as changes in national employment.

At the state/territory level, we assume that labour is imperfectly mobile between state economies. Thus a region that is favourably affected by the Project will experience a mix of increased employment and increased wage-rates relative to regions that are less favourably affected.

People move between regions so as to maintain unemployment-rates at their base case levels.

Public expenditure, taxes and government budget balances

We assume that real consumption by regional governments and real consumption by the federal government are unaffected by the Project. We assume that all indirect tax rates have the same values as in the base case simulation. The Federal government's budget balance is fixed to its base case value via endogenous adjustments to the average PAYG tax rate. State government budget balances are fixed via endogenous changes in direct transfer payments to households.

Consumption, investment, ownership of capital and measurement of welfare

In each year of the deviation scenarios, the composition of aggregate real consumption across states/territories diverges from its base case level by an amount reflecting the divergence in real income available to residents. In calculating real income available for consumption we take account of: direct income from factors (with an allowance for the net flow of foreign income); income from other sources such as government welfare payments; and income tax. Because the balances on government accounts are kept fixed, the impacts on real private consumption in each region are reliable indicators of the impact of the Project on the economic welfare of incumbents.

Rates of return on capital

In deviation simulations MMRF-Green allows for short-run divergences in rates of return on industry capital stocks from their levels in the base case forecasts. Such divergences cause divergences in investment and capital stocks. The divergences in capital stocks gradually erode the divergences in rates of return, such that in the longer term rates of return have returned to their base case values.

Production technologies

MMRF-Green contains many types of technical change variables. In the deviation simulations we assume that all technology variables, other than those required to implement the shocks, have the same values as in the base case simulation.

Appendix C

Additional MMRF-Green Results

C.1 Percentage deviations from base case values: State and National macroeconomic variables

Percentage deviations from base case values: State and National macroeconomic variables		2007	2008	2009	2015	2020	2025	2030
Real gross value added (GDP/GSP)	Aus	0.01	0.02	0.03	0.03	0.03	0.03	0.03
	Tas	1.32	2.71	2.12	2.19	2.33	2.39	2.43
	ROA	-0.02	-0.04	-0.02	-0.02	-0.03	-0.03	-0.03
Real consumption	Aus	0.03	0.05	0.03	0.03	0.04	0.04	0.04
	Tas	1.03	2.23	1.54	1.86	2.23	2.40	2.49
	ROA	0.00	0.00	0.00	-0.01	-0.01	-0.02	-0.02
Real investment	Aus	0.20	0.41	0.10	0.03	0.03	0.02	0.02
	Tas	9.67	20.01	5.38	1.93	2.19	2.16	2.14
	ROA	0.00	-0.02	-0.02	-0.02	-0.03	-0.03	-0.03
Real international exports	Aus	-0.25	-0.47	-0.06	0.02	0.01	0.00	0.00
	Tas	-2.36	-4.06	1.95	3.68	2.87	2.51	2.28
	ROA	-0.21	-0.39	-0.10	-0.08	-0.08	-0.08	-0.08
Real international imports	Aus	0.10	0.20	0.03	0.00	0.00	0.00	-0.01
	Tas	5.33	10.88	4.00	2.57	2.80	2.85	2.87
	ROA	0.01	0.01	-0.04	-0.04	-0.05	-0.06	-0.06
Employment (hours)	Aus	0.01	0.02	0.00	0.00	0.00	0.00	0.00
	Tas	2.24	4.42	1.75	1.52	1.78	1.88	1.92
	ROA	-0.03	-0.06	-0.03	-0.03	-0.03	-0.04	-0.04

C.2 Absolute deviations from base case values: State and National macroeconomic variables

Absolute deviations from base case values: State and national macroeconomic variables		2007	2008	2009	2015	2020	2025	2030
Real gross value added (GDP/GSP) (\$million, 2005 prices)	Aus	85.1	196.8	233.4	281.5	298.4	307.7	324.2
	Tas	226.5	480.9	386.9	466.9	548.9	614.8	675.8
	ROA	-141.4	-284.1	-153.5	-185.4	-250.5	-307.1	-351.6
Real consumption (\$million, 2005 prices)	Aus	116.9	240.0	142.9	166.8	205.2	226.6	245.8
	Tas	105.9	231.5	162.1	215.2	277.5	320.9	359.2
	ROA	11.0	8.5	-19.2	-48.4	-72.3	-94.3	-113.4
Real investment (\$million, 2005 prices)	Aus	499.5	1023.0	229.5	50.8	55.4	49.6	48.5
	Tas	509.5	1066.9	285.7	105.5	126.3	133.5	141.7
	ROA	-10.0	-43.9	-56.2	-54.7	-70.9	-83.9	-93.2
Real international exports (\$million, 2005 prices)	Aus	-357.6	-704.8	-92.5	48.7	13.9	-4.2	-15.6
	Tas	-66.7	-131.0	71.1	212.8	202.1	202.0	204.2
	ROA	-290.9	-573.8	-163.7	-164.2	-188.3	-206.3	-219.9
Real international imports (\$million, 2005 prices)	Aus	175.6	355.1	53.3	5.3	-3.0	-13.6	-21.6
	Tas	158.3	331.3	124.2	91.0	108.7	120.5	131.3
	ROA	17.3	23.8	-70.9	-85.7	-111.8	-134.1	-152.9
Employment (thousands persons)	Aus	0.6	1.2	0.3	0.3	0.3	0.3	0.3
	Tas	1.7	3.4	1.4	1.3	1.6	1.8	1.9
	ROA	-1.2	-2.2	-1.0	-1.0	-1.3	-1.5	-1.6

C.3 Percentage deviations in industry output***Australia (including Tasmania)***

Percentage deviations from base case values: National industry output							
	2007	2008	2009	2015	2020	2025	2030
Agriculture	-0.1	-0.2	-0.1	0.0	0.0	0.0	0.0
Forestry	0.0	0.0	-0.1	0.2	0.2	0.2	0.2
Iron Ore	-0.1	-0.2	-0.1	-0.1	-0.1	-0.1	-0.1
Non-Ferrous metal ore	-0.1	-0.2	-0.1	-0.1	-0.1	-0.1	-0.1
Black Coal	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Crude Oil	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Natural gas	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Brown Coal	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Food, beverages	-0.1	-0.2	-0.1	0.0	0.0	0.0	0.0
Textiles, clothing and footwear	-0.1	-0.3	-0.1	-0.1	-0.1	-0.1	-0.1
Wood and paper products (excluding new pulp mill)	0.0	-0.1	-0.4	-0.4	-0.4	-0.4	-0.3
Basic chemical products	-0.1	-0.1	0.0	0.0	0.0	0.0	0.0
Petroleum products	0.0	-0.1	0.0	0.0	0.0	0.0	0.0
Non-metallic building materials	0.1	0.1	0.1	0.0	0.0	0.0	0.0
Cement	0.0	0.1	0.0	0.0	0.0	0.0	0.0
Iron and steel	-0.1	-0.2	0.0	0.0	0.0	0.0	0.0
Aluminium/alumina	0.0	-0.1	-0.1	-0.1	-0.1	-0.1	0.0
Other metal products	0.0	-0.1	0.0	0.0	0.0	0.0	0.0
Motor vehicles and parts	0.0	0.0	-0.1	0.0	0.0	0.0	0.0
Other manufacturing	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Electricity generation - black coal	0.0	-0.1	0.0	0.0	0.0	0.0	-0.1
Electricity generation - brown coal	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Electricity generation - natural gas	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Electricity generation - oil	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Electricity generation - hydro	0.2	0.4	0.0	-0.1	0.0	0.1	0.3
Electricity generation - biomass	0.0	-0.1	15.3	15.5	14.0	12.8	11.7
Electricity generation - biogas	0.0	0.0	-0.1	0.0	0.0	0.0	0.0
Electricity generation - solar	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Electricity generation - wind	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Electricity supply	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Urban gas distribution	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Water and drainage services	0.0	0.0	0.0	0.0	0.1	0.1	0.1
Construction services	0.1	0.3	0.1	0.1	0.1	0.1	0.0
Trade and accommodation services	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Road transport - passenger	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Road transport - freight	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rail transport - passenger	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rail transport - freight	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Water transport - passenger	-0.2	-0.4	0.3	0.7	0.6	0.5	0.5
Water transport - freight	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Air transport - passenger	-0.1	-0.2	-0.1	0.0	0.0	0.0	0.0
Air transport - freight	0.1	0.3	0.1	0.0	0.0	0.0	0.0
Other transport services	-0.1	-0.1	0.0	0.0	0.0	0.0	0.0
Communication services	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Percentage deviations from base case values: National industry output							
	2007	2008	2009	2015	2020	2025	2030
Financial and business services	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ownership of dwellings services	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Government services	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other services	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Private transport services	0.0	0.0	0.1	0.0	0.1	0.1	0.1

Tasmania

Percentage deviations from base case values: Tasmanian industry output							
	2007	2008	2009	2015	2020	2025	2030
Agriculture	-0.4	-0.9	-0.6	-0.1	-0.1	0.0	0.0
Forestry	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Iron Ore	-0.5	-1.0	-0.4	0.0	0.0	0.0	0.0
Non-Ferrous metal ore	-1.1	-2.1	-1.1	-0.4	-0.2	-0.1	0.0
Black Coal	-0.1	-0.4	-0.9	0.1	0.5	0.7	0.9
Crude Oil	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Natural gas	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Brown Coal	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Food, beverages	-0.9	-1.8	-0.9	0.1	0.3	0.4	0.4
Textiles, clothing and footwear	-1.3	-2.6	-1.6	-0.4	-0.2	0.0	0.1
Wood and paper products (excluding new pulp mill)	-0.5	-1.1	-7.1	-6.7	-4.4	-2.6	-1.2
Basic chemical products	-0.8	-1.9	-0.1	3.4	4.1	4.2	4.1
Petroleum products	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Non-metallic building materials	0.5	1.4	1.0	1.3	1.4	1.4	1.4
Cement	-0.4	-1.0	-0.6	0.0	0.1	0.2	0.2
Iron and steel	-1.8	-3.2	-0.7	0.5	0.5	0.6	0.6
Aluminium/alumina	-0.3	-0.5	0.0	0.0	0.0	-0.1	-0.1
Other metal products	0.6	1.5	1.3	2.1	2.4	2.4	2.4
Motor vehicles and parts	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other manufacturing	-0.1	0.2	0.7	1.4	1.5	1.5	1.5
Electricity generation - black coal	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Electricity generation - brown coal	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Electricity generation - natural gas	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Electricity generation - oil	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Electricity generation - hydro	0.4	0.8	0.0	-0.2	0.0	0.3	0.6
Electricity generation - biomass	0.0	0.0	287.8	272.8	243.3	222.4	206.3
Electricity generation - biogas	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Electricity generation - solar	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Electricity generation - wind	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Electricity supply	0.4	0.9	2.2	1.8	1.7	1.8	1.9
Urban gas distribution	-0.5	-0.9	0.3	0.7	0.8	0.8	0.8
Water and drainage services	0.4	0.8	0.9	1.6	1.9	2.1	2.2
Construction services	5.8	12.5	4.6	2.2	2.3	2.3	2.2
Trade and accommodation services	1.8	3.7	1.2	0.9	1.1	1.2	1.3
Road transport - passenger	0.8	1.5	2.9	3.3	3.2	3.2	3.1
Road transport - freight	1.8	3.7	2.1	2.0	2.1	2.1	2.1
Rail transport - passenger	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rail transport - freight	0.9	1.6	-4.0	-3.2	-2.7	-2.2	-1.9
Water transport - passenger	-1.1	-2.0	1.5	4.2	3.8	3.1	2.7
Water transport - freight	0.1	0.3	-1.3	-0.8	-0.6	-0.5	-0.4

Percentage deviations from base case values: Tasmanian industry output							
	2007	2008	2009	2015	2020	2025	2030
Air transport - passenger	-1.3	-3.1	-2.5	-0.7	-0.4	-0.2	-0.1
Air transport - freight	5.9	12.2	3.3	1.5	1.7	1.8	1.9
Other transport services	0.0	0.0	0.7	1.8	1.7	1.6	1.6
Communication services	0.5	1.1	1.5	1.8	1.9	1.9	1.9
Financial and business services	1.1	2.3	1.9	2.1	2.2	2.3	2.4
Ownership of dwellings services	0.0	-0.1	-0.1	1.1	1.7	2.1	2.3
Government services	0.3	0.7	0.4	0.5	0.6	0.6	0.6
Other services	0.3	0.6	0.9	1.2	1.3	1.3	1.3
Private transport services	0.0	1.2	2.6	2.0	2.4	2.4	2.5

C.4 Absolute deviations in industry output

Australia (including Tasmania)

Absolute (\$m) deviations from base case values: National industry real value added							
	2007	2008	2009	2015	2020	2025	2030
Wood and paper products (excluding new pulp mill)	-7.1	-16.3	-75.8	-91.6	-87.9	-83.2	-79.5
Agriculture	-23.1	-45.5	-18.0	-12.6	-13.7	-14.6	-15.0
Non-Ferrous metal ore	-6.1	-12.7	-7.1	-7.4	-8.8	-9.9	-10.7
Black Coal	-4.4	-9.1	-5.1	-6.7	-8.7	-10.4	-11.9
Food, beverages	-13.2	-26.0	-8.8	-4.8	-5.0	-5.1	-4.9
Air transport - passenger	-5.4	-12.0	-6.6	-3.5	-3.7	-3.8	-3.8
Aluminium/alumina	-1.5	-4.1	-3.8	-4.0	-4.8	-5.0	-5.0
Textiles, clothing and footwear	-6.2	-12.2	-4.4	-2.8	-3.0	-3.1	-3.0
Natural gas	-0.8	-1.6	-0.9	-1.8	-2.8	-4.0	-5.3
Electricity generation - black coal	-0.7	-1.6	-1.2	-1.4	-1.8	-2.1	-2.3
Iron and steel	-4.8	-8.9	-2.2	-0.9	-1.0	-1.1	-1.0
Other metal products	-4.4	-6.9	-0.8	-0.9	-1.1	-1.5	-1.5
Motor vehicles and parts	0.1	-1.0	-2.8	-1.4	-1.5	-1.5	-1.4
Iron Ore	-0.9	-1.9	-1.1	-1.1	-1.2	-1.3	-1.4
Rail transport - freight	-0.3	-0.6	-0.5	-0.6	-0.7	-0.8	-0.8
Crude Oil	-0.3	-0.6	-0.3	-0.3	-0.4	-0.5	-0.6
Other manufacturing	1.5	6.8	3.1	-0.3	-0.7	-1.2	-1.1
Water transport - freight	-0.1	-0.2	-0.3	-0.3	-0.3	-0.3	-0.3
Trade and accommodation services	10.5	26.5	6.1	-2.3	-2.1	-1.6	0.6
Rail transport - passenger	0.0	0.0	-0.2	-0.2	-0.2	-0.2	-0.2
Brown Coal	0.0	0.1	-0.1	-0.1	0.0	-0.1	-0.2
Electricity generation - brown coal	0.1	0.1	-0.2	0.0	0.0	0.0	0.0
Electricity generation - biogas	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Electricity generation - solar	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Electricity generation - oil	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Electricity generation - wind	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Petroleum products	-0.2	-0.4	0.0	0.1	0.1	0.1	0.1
Air transport - freight	0.2	0.5	0.2	0.0	0.0	0.0	0.0
Urban gas distribution	0.0	0.0	0.0	0.0	0.1	0.1	0.1
Electricity generation - natural gas	-0.1	-0.1	-0.1	0.0	0.2	0.2	0.2
Cement	0.2	0.4	0.1	0.1	0.1	0.1	0.1
Electricity generation - hydro	1.4	3.3	0.8	-1.0	0.2	2.1	4.3
Electricity supply	0.0	0.3	2.3	1.5	1.4	1.1	1.0
Non-metallic building materials	2.8	6.4	2.9	1.4	1.3	1.2	1.3
Road transport - passenger	0.0	0.2	1.7	2.3	2.4	2.5	2.6

Absolute (\$m) deviations from base case values: National industry real value added							
	2007	2008	2009	2015	2020	2025	2030
Forestry	-0.3	-0.7	-1.3	1.7	3.4	4.6	5.7
Basic chemical products	-6.7	-12.7	-0.6	4.4	4.6	4.3	4.2
Road transport - freight	-0.6	0.4	3.9	3.5	3.1	2.7	2.7
Other transport services	-7.4	-15.4	-1.4	5.5	5.3	5.2	5.3
Water and drainage services	0.1	0.4	1.5	3.3	4.1	4.7	5.3
Other services	1.6	2.9	3.2	5.9	6.7	7.3	7.8
Water transport - passenger	-1.0	-2.3	2.1	8.1	7.6	7.3	7.2
Private transport services	0.1	5.7	11.6	6.7	7.9	8.0	8.4
Communication services	1.2	2.8	4.8	7.8	8.4	8.8	9.3
Government services	3.3	6.0	5.6	11.4	15.2	18.6	22.5
Electricity generation - biomass	0.0	0.0	13.9	15.9	15.9	15.9	15.9
Ownership of dwellings services	0.4	2.8	6.6	24.9	32.5	37.8	41.8
Financial and business services	1.9	10.9	24.1	32.9	36.0	38.4	41.8
Construction services	111.8	236.9	87.8	45.9	47.2	45.8	46.8

Tasmania

Absolute (\$m) deviations from base case values: Tasmanian industry real value added							
	2007	2008	2009	2015	2020	2025	2030
Wood and paper products (excluding new pulp mill)	-2.5	-6.8	-46.7	-55.5	-35.4	-14.3	3.9
Agriculture	-2.7	-6.5	-5.2	-1.4	-0.3	0.3	0.8
Air transport - passenger	-0.7	-2.0	-2.1	-0.7	-0.5	-0.3	-0.2
Textiles, clothing and footwear	-1.1	-2.5	-1.7	-0.6	-0.2	0.1	0.3
Non-Ferrous metal ore	-1.2	-2.5	-1.5	-0.5	-0.2	0.0	0.3
Aluminium/alumina	-0.3	-0.6	-0.4	-0.3	-0.4	-0.6	-0.6
Rail transport - freight	0.0	0.1	-0.2	-0.3	-0.3	-0.2	-0.2
Water transport - freight	0.0	0.1	-0.2	-0.2	-0.1	-0.1	-0.1
Iron Ore	-0.2	-0.4	-0.2	0.0	0.0	0.0	0.0
Forestry	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crude Oil	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Natural gas	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Brown Coal	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Petroleum products	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Motor vehicles and parts	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Electricity generation - black coal	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Electricity generation - brown coal	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Electricity generation - natural gas	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Electricity generation - oil	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Electricity generation - biogas	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Electricity generation - solar	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Electricity generation - wind	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rail transport - passenger	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cement	-0.2	-0.5	-0.3	0.0	0.1	0.1	0.2
Urban gas distribution	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Black Coal	0.0	0.0	-0.1	0.0	0.1	0.2	0.2
Air transport - freight	0.3	0.6	0.2	0.1	0.1	0.1	0.1
Iron and steel	-1.3	-2.5	-0.6	0.7	0.8	1.0	1.1
Food, beverages	-2.9	-6.1	-3.3	0.6	1.6	2.2	2.7
Electricity generation - hydro	1.5	3.5	1.0	-0.8	0.4	2.4	4.6
Non-metallic building materials	0.5	1.4	1.1	1.6	1.8	1.9	2.1
Electricity supply	0.7	1.6	3.9	2.7	2.6	2.9	3.3
Road transport - passenger	0.6	1.2	2.4	3.2	3.4	3.6	3.7

Absolute (\$m) deviations from base case values: Tasmanian industry real value added							
	2007	2008	2009	2015	2020	2025	2030
Other manufacturing	-0.1	0.3	1.3	3.3	3.9	4.2	4.5
Other metal products	0.6	1.7	1.6	3.1	3.8	4.1	4.4
Water and drainage services	0.7	1.7	2.1	4.1	5.2	6.1	6.9
Basic chemical products	-0.7	-1.8	-0.3	4.8	6.6	7.5	8.0
Other services	1.1	2.3	3.5	5.4	6.2	6.8	7.3
Water transport - passenger	-0.4	-1.0	0.7	7.4	8.2	7.9	7.7
Other transport services	0.0	0.1	2.2	8.4	9.2	9.5	9.9
Communication services	1.9	4.1	6.0	8.8	9.9	10.6	11.3
Private transport services	0.1	4.7	10.2	8.6	10.8	11.6	12.7
Road transport - freight	6.3	14.4	9.4	10.3	11.7	12.8	13.9
Electricity generation - biomass	0.0	0.0	13.9	15.9	15.9	15.9	15.9
Government services	10.7	22.1	13.4	18.5	23.7	27.5	30.8
Ownership of dwellings services	0.3	1.3	3.4	26.6	38.2	47.4	55.3
Trade and accommodation services	45.0	97.7	37.8	31.6	40.8	48.1	54.7
Financial and business services	19.8	45.4	41.4	53.3	62.0	68.6	74.5
Construction services	111.1	240.9	97.3	58.6	63.4	64.5	66.9

C.5 Tax revenues

Absolute deviations from base case values: Tax revenues							
	2007	2008	2009	2015	2020	2025	2030
GST - collected in TAS	8.5	18.5	13.0	17.2	22.2	25.7	28.7
GST - collected elsewhere	0.9	0.7	-1.5	-3.9	-5.8	-7.5	-9.1
GST- Total	9.3	19.2	11.4	13.3	16.4	18.1	19.7
Company tax - national	10.2	23.6	28.0	33.8	35.8	36.9	38.9
Labour tax - national	8.4	17.8	4.9	3.9	4.8	4.7	4.9
Royalty revenue	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other tax revenue (Tas)	5.7	12.0	9.7	11.7	13.7	15.4	16.9
Other tax revenue (ROA)	-3.5	-7.1	-3.8	-4.6	-6.3	-7.7	-8.8

C.6 Regional Employment and Gross Regional Product

Absolute and percentage deviations from base case values: Tasmanian sub-state macroeconomic variables							
	2007	2008	2009	2015	2020	2025	2030
Percentage deviations — Gross Regional Product							
Greater Hobart	1.2	2.4	1.7	1.2	1.2	1.1	1.1
Southern	0.4	0.8	0.9	1.3	1.3	1.4	1.3
Northern (includes Bell Bay)	3.0	5.8	3.6	4.0	4.3	4.4	4.4
Mersey-Lyell	0.4	0.8	0.5	0.9	1.0	1.0	1.1
Absolute deviations (\$m) — Gross Regional Product							
Greater Hobart	76.9	160.3	120.9	95.4	101.7	106.9	113.2
Southern	4.4	9.6	12.8	23.3	28.6	32.9	36.7
Northern (includes Bell Bay)	130.3	278.1	227.3	297.7	354.2	399.5	441.0
Mersey-Lyell	14.8	32.8	26.0	50.6	64.4	75.4	84.9
Percentage deviations — Employment							
Greater Hobart	1.6	3.1	1.0	0.5	0.6	0.7	0.7
Southern	0.8	1.5	0.7	0.9	1.1	1.2	1.2
Northern (includes Bell Bay)	4.7	9.2	3.0	2.9	3.7	4.0	4.2
Mersey-Lyell	0.8	1.5	0.4	0.5	0.7	0.7	0.8

Absolute and percentage deviations from base case values: Tasmanian sub-state macroeconomic variables							
	2007	2008	2009	2015	2020	2025	2030
Absolute deviations ('000 persons) — Employment							
Greater Hobart	0.5	1.0	0.4	0.2	0.3	0.3	0.3
Southern	0.0	0.1	0.0	0.1	0.1	0.1	0.1
Northern (includes Bell Bay)	1.0	2.0	0.8	0.8	1.0	1.2	1.3
Mersey-Lyell	0.1	0.3	0.1	0.1	0.2	0.2	0.2