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**Economic Assessment of the Gunns Pulp Mill
2004 - 2008**

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Abstract

This paper outlines the process for evaluating the economic effects of Gunns proposed pulp mill in northern Tasmania. Removal of the project from the Resource planning and Development Commission had two important effects. First, assumptions underlying the proponent's impact statement could not be tested in public hearings. Second, important parts of the RPDC economic assessment criteria were never addressed. In the end, the review process was structured so that only one outcome, favourable to the proponents, was ever possible.

Introduction

Speaking in support of the Pulp Mill Permit on 30 August 2007, Legislative Councillor Mr Jim Wilkinson concluded that 'I am satisfied that the pulp mill proposal has been assessed against the guidelines established by the RPDC and against the conditions that were imposed by various regulators according to the law'. Some seven weeks earlier the economic consulting firm ITS Global had completed its review of the social and economic benefits of the mill. It is clear from the Hansard record of the debate that many Councillors relied on the conclusions of this review in supporting the granting of a permit for the mill, but it is a matter of speculation as to whether Councillors other than Mr Wilkinson believed that the RPDC guidelines had been met. The review by ITS Global, however, leaves no doubt as to its position – it noted that since Gunns had withdrawn from the RPDC assessment process, the guidelines for the draft IIS were 'defunct'[1].

For the Lennon government it was self-evident that the large investment associated with the mill would benefit Tasmanians. In 2004, well before any formal assessment process had begun, Economic Development Minister Lara Giddings said that

'There are clear benefits for Tasmania in developing a pulp mill. The benefits can be measured in terms of jobs and economic growth through the downstream processing of our timber resource and we are determined to do all we can to see a modern pulp mill facility using world's best practice in Tasmania.'[2]

The government was true to its word. Significant funds from Commonwealth and State governments were spent to facilitate development of the mill proposal and to persuade Tasmanians of its merits. The Tasmanian government lobbied for continuation of tax concessions under managed investment schemes so as to ensure the financial viability of the mill and, after the mill permit was legislated by the Tasmanian parliament, for Commonwealth infrastructure funding for transportation of pulpwood around the state.

The effect of withdrawing the mill from the RPDC assessment process was that these and other expenditures or tax concessions, together with possible externality costs, were never quantified by either the proponents or reviewers of the IIS. This made it inevitable that the assessment process would find 'clear economic and social benefits' from building the mill.

The focus of this paper is on the adequacy of the economic assessment of the pulp mill project – both through the RPDC process and the subsequent ITS Global review commissioned by the Department of Premier and Cabinet. The story begins with an outline of the RPDC assessment criteria, followed by a section illustrating the pro-mill environment of political spin in which the assessment took place. I then analyse the assessment process in two stages. The first stage comprises three sections which examine the economic modelling strategy underpinning Gunns' IIS, the welfare measures derived from it, and whether the IIS met the RPDC guidelines. The second stage deals with events after submission of the IIS – the peer review reports of the IIS, the ITS Global review, and the modelling conducted by the National Institute of Economic and Social Research.

It is just possible that, had a more critical assessment been completed, a broad consensus might have been reached in which a formal benefit-cost analysis showed the mill to be of net benefit to the residents of Tasmania. This is not what happened. The last section of the chapter concludes that, at the time Mr Wilkinson spoke, the economic assessment of the pulp mill was incomplete in a number of important respects – consideration of subsidies for the

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[1] ITS Global (2007), p.8.
[2] Press release by Minister Lara Giddings announcing the establishment of the Pulp Mill Task Force, 18 August 2004.

mill had been sidelined; important modelling assumptions had not been scrutinised; the possible cost of environmental externalities had been excluded; and benefits accruing to Tasmanian households had been misrepresented.

RPDC Assessment Criteria

The role of economic assessment in approving major developments appears to be straightforward – evaluate social benefits and social costs and, if the latter exceeds the former, approve the project. Practical implementation of this assessment is, however, always contentious and no more so than in evaluation of Gunns' pulp mill proposal.

A number of issues make assessment problematic. Which costs and benefits are relevant? How should they be measured? Who bears the costs and who enjoys the benefits? Who scrutinises claims made by proponents and opponents?

Final Scope Guidelines produced by the RPDC in December 2005, address the first two of these questions. Section 2.1 specifies that the introductory section of the IIS

'... should describe the pulp mill in the context of international pulp import and export markets and the predicted benefits and costs of the pulp mill with respect to Tasmania and Australia. Provide a descriptive and quantitative analysis of the benefits and costs of the pulp mill, including but not necessarily limited to, an assessment of the pulp mill impacts on the Australian balance of trade and associated services and markets. This should include a summary of overall conclusions of the net pulp mill impacts based on environmental, social, economic and community costs and benefits.'[3]

while Section 8.4 requires the proponent to detail

'… any government supplied benefits that have or will be supplied to the proponent to make the project viable or reduce its risk exposure (including direct government financial or infrastructure contributions, or tax concessions). The proponent should take account of the timing of payments and costs, including the costs of additional monitoring to all levels of government over the life of the project and anticipated contributions. Any anticipated forms of public subsidy, both direct and indirect, shall be identified and described. Any costs to be borne by public expenditure for the management of social, environmental and economic impacts of the pulp mill project should be individually detailed'.[4]

The third question on distributional issues is sidestepped by implicit use of the so-called Kaldor-Hicks criterion in welfare economics, whereby a project is approved if the aggregate benefits exceed the aggregate costs. This amounts to the requirement that the benefits should be large enough that those that benefit could, *in theory*, compensate those that bear the costs. Precisely how this is to be achieved is left unspecified but the political process has a role to play. Private remedies may also be available if the losers to access the legal system to enforce compensation for damages should they occur, although there is some uncertainty as to whether this course is ruled out by s.11 of the PMAA .

Procedures for projects of State Significance address the fourth question. Under these procedures, there are four opportunities for review of the proponents' draft IIS against the

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[3] RPDC Final Scope Guidelines, December 2005, p.8. This section is unclear as to the relevant constituency – is it Tasmanians, or Australians? This is important because, as is detailed subsequently, most of the economic impacts modelled in Gunns IIS derive from a diversion of resources from mainland Australia to Tasmania.
[4] RPDC Final Scope Guidelines, December 2005, p.64-65.

RPDC guidelines – peer review reports on the IIS initiated by the RPDC; submissions and hearings on the IIS; submissions and hearings on the RPDC's draft assessment report; and approval of both the Tasmanian Premier and the Australian Government Minister for Environment and Heritage.

Spin

Assessment of the mill was accompanied by a drumbeat of overblown claims as to the importance of forestry in the Tasmanian economy. Lobbyists such as the Construction, Manufacturing, Forestry and Engineering Union (CMFEU) and Timber Communities Tasmania, a lobby group largely funded by the forestry industry, lost no opportunity to argue that forestry underpinned growth in the Tasmanian economy while simultaneously stressing the need for government handouts to sustain further growth.

Given their constituency, such behaviour is understandable and appears to have been successful. In 2007, for example, 24% of survey respondents thought that forestry had 'made the greatest contribution to the growth of Tasmania's economy in the last few years' – second only in importance to tourism.[5] It is hard to reconcile this response with the reality that Tasmanian woodchip exports had declined since 2000, and forest contractors had, in 2007, asked the Commonwealth for a $93m package to help them exit the industry.[6]

While it might be difficult for the general public to discount repeated but erroneous claims, more is expected from the responsible ministers. But Bryan Green, then Minister for Infrastructure, Energy and Resources, was infected by the lobbyists' enthusiasm for forestry and wood products industry. For example, in his submission to the Australian Government's review of taxation treatment of plantation forestry, he claimed that 'these industries contribute ... 23 % of Gross State Product ... and directly employ around 10,700 people (1 in 13 workforce participants)'.[7]

These claims, which appear to have been sourced from a CFMEU website, were wildly inflated. Schirmer (2008) estimated employment in the forestry and wood products industry to have been 6300 in 2005-06 which, given the Tasmanian workforce of 222,000 persons, is 2.9% of the total. That is, the industry employed one in 35 workers, not one in 13 as claimed by Minister Green. Data on value added in the forestry and wood products industry are not compiled by the Australian Bureau of Statistics, but even in the unlikely event that workers in the industry were twice as productive as the Tasmanian average, their contribution to Gross State Product would have been 5.8%, not 23% as claimed by Minister Green.

The same attitude prevailed in characterising the results of the IIS. Consider three examples, one from Gunns' advertising, and two from responsible ministers.

The Gunns example is taken from a series of advertisements during the 2007 federal election campaign, one of which made the claim that the mill 'will provide government with an extra $1 billion in revenue to fund health, education and other community services'.[8] This claim is worth analysing at some length, as it is misleading in several important respects.

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[5] Enterprise Marketing & Research Services Pty Ltd (2007).
[6] Department of Agriculture, Fisheries and Forestry (2007).
[7] Department of Infrastructure, Energy and Resources (2005), p.2.
[8] Gunns Limited (2007), 'Inconvenient facts the Greens will not discuss', *The Mercury*, p.10, 7 November.

The CoPS model results are that the mill generates an increase in tax revenues for all levels of government with a discounted present value of $834m[9]. Perhaps it was just a rhetorical flourish by Gunns to 'round up' to the nearest billion dollars, but there are other difficulties.

The first is that while IIS tabulates revenues (other than income taxes) generated in Tasmania as State government revenue most of these revenues accrue, in the first instance, to the Commonwealth government; only $170m are State and local government taxes. The CoPS modelling logic, however, is based on *marginal* rather than *average* effects. This means that treating GST revenues generated in Tasmania, as a State tax overstates the allocation of GST revenues that Tasmania would receive *consequent on the construction of the mill*. The Commonwealth Grants Commission allocates Australian GST revenues to the states in a complicated way, but the essential point is that the process generates a proportion – in its most recent allocation, Tasmania received around 3.6% of the total – which is used to calculate GST revenue shares. Applying the marginal logic of CoPS modelling, therefore, Tasmania could expect to receive 3.6% of the total change in Australian GST revenues.

Using year-2030 figures from the IIS as an example, GST collected in Tasmania is estimated to rise by $28.7m, while for Australia as a whole, the increase is $19.7m. Assuming unchanged Grants Commission proportions, therefore, the increase in GST revenue which Tasmania could expect to receive in year 2030 would be 3.6% of $19.7m, or less than $1m, not the $28.7m figure tabulated in the IIS. Although the same Grants Commission formula does not apply to Commonwealth income taxes, the same general argument applies. So a more realistic interpretation of the CoPS results is that the present value of tax revenues accruing to local and State governments in Tasmania is of the order of $200m, not $1000m, as claimed by Gunns.

Unfortunately, the confusion does not end there. Both the IIS (and the subsequent ITS Global review) overlook one of the modelling assumptions of the CoPS model, which is that government expenditures are held fixed and the budget balance is unchanged. This assumption is implemented by the modelling requirement that all tax revenues are given back to households as a lump-sum transfer who, in turn, spend the transfer in the same way as other components of household disposable income. So, in the IIS, there are *no* tax revenues available to be spent on 'health, education and other community services'.

Having considered the Gunns example of spin at some length, turn now to two other examples, from Treasure Aird and Premier Lennon.

Answering a question from the Legislative Council member for Rumney on 19 April 2007, Treasurer Michael Aird heralded an era of supercharged growth for Tasmania, claiming that

'…. if the pulp mill is developed, it will give a lift to the economy of 2.5 % growth every year. When you consider we have around 3.5 % growth now, the 2.5 % growth that can be achieved by building the pulp mill will give a huge lift to the general wellbeing of the State. … It is not quite a doubling but it is still quite an impressive figure and it would be a sustainable figure right through.'[10]

This answer is highly misleading as it suggests that the mill would lead to a sustained annual growth rate of around 6 %. As will be described in more detail in the next section, IIS modelling does *not* report annual growth rates of Gross State Product (GSP). What it does is

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[9] In the IIS discounted present values apply to the relevant annual flows from 2007 to 2030, expressed in constant prices; a discount rate of 5% is used.
[10] Legislative Council Hansard, 19 April 2007.
http://www.parliament.tas.gov.au/HansardCouncil/isysquery/a034df15-27d1-4cf0-9669-0336f97a8104/10/doc/

to calculate the difference in the *level* of GSP with and without the mill. The pitfalls of Mr Aird's analysis are easily demonstrated over the three-year construction period by taking his assumption of 3.5% annual growth without the mill, together with the IIS results for the effect of the mill on the level of GSP. Combining these two sets of numbers and expressing the resulting aggregate as a year-on-year percentage change gives the following sequence of growth rates: 2007: 4.86%, 2008: 4.91%, 2009: 2.90%[11]. In terms of year-on-year growth rates, the 6 % figure is never reached and in 2009 the year-on-year growth rate is, inconveniently, *lower* than the 'without-the-mill' growth rate of 3.5 %.

Premier Lennon tried a different approach to spruiking the benefits of the mill. In April 2007 he wrote to the Tasmanian public with the claim that the mill would mean 'an extra $870 each year for every Tasmanian household.'[12] The derivation of this figure was never revealed but the public required no coaching to recognise the implication of the Premier's claim – that all Tasmanian households would get an equal share of the spoils – was nonsense.

Did the IIS address the RPDC Guidelines?

The RPDC guidelines did not require Gunns to undertake a formal cost-benefit analysis. Rather, section 8.4 requires that any past, present or anticipated public-supplied benefits, together with costs of environmental monitoring and management, should be enumerated.

Readers of section 8.4 of the RPDC guidelines might reasonably have concluded, for example, that tax benefits such as those provided by managed investment schemes (MIS) fall within the ambit of the IIS in the sense that they provided 'benefits to make the project viable or reduce its risk exposure'.[13] It also appears that governments and industry implicitly agreed with this position. Consider the following:

- In 2005 the Tasmanian Government argued for continuation of MIS schemes because

'The Tasmanian government is concerned that a policy change by the Australian Government could undermine investment decisions and jeopardise crucial investments. For example, if a policy change resulted in a significant reduction in plantation development in Tasmania, the outcome could place at risk the proposed Gunns pulp mill …'[14]

- Recording the favourable outcome of the inquiry into MIS schemes, the Commonwealth Department of Agriculture, Fisheries and Forests noted that

'A number of planned key project proposals, valued at several billion dollars, depend directly on further expansion of the MIS plantation sector. They include the Gunns pulp mill in Tasmania, the Protavia pulp mill at Penola in the Green Triangle,

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[11] If the level of GSP is given a base-period value of 100 in 2006, a 3.5% growth rate for the following three years gives values of 103.5, 107.12 and 110.87. The IIS reports (Table C1, p.56) that these three values will be higher by 1.32%, 2.71%, and 2.12% respectively, giving a 'with the mill' sequence of GSP levels over the three years of 104.86, 110.03 and 113.22. Year-on-year percentage changes based on this sequence give the numbers cited in the text.

[12] Lennon (2007).

[13] Although the following discussion is focussed on managed investment schemes, Round Table for Sustainable Industry (2007) identified a number of other areas involving significant government subsidy.

[14] Department of Infrastructure, Energy and Resources (2005), p.2.

expansion of the Visy pulp mill at Tumut in NSW and the PaperlinX pulp mill upgrade at Maryvale in Victoria.'[15]

- This outcome was enthusiastically endorsed by Gunns who noted that

'The industry has lobbied tirelessly to ensure that the government fully understands the significant benefits of the expanding forest industry to regional and rural Australia. Over $4 billion worth of value-adding processing plants are being planned or developed in regional areas around Australia on the back of MIS funded plantations including Gunns Ltd's $1.4 billion pulp mill at Bell Bay.'[16]

The IIS response to the RPDC requirement in section 8.4 was, however, brief. While acknowledging that 'Gunns has also benefited from Commonwealth Government R&D support with respect to the project, and the Commonwealth Government's Managed Investment Scheme'[17], and that the company had 'been in discussions with Governments with respect to support for common user, public benefit infrastructure aspects of the project' these benefits were not quantified or included in formal modelling because 'nothing had been contracted with the Tasmanian or Commonwealth Governments'[18].

Were it to rely on contracts with individual taxpayers the Australian tax system, of which the tax rules for MIS schemes are a part, would be unique. In any event, the IIS apparently had no difficulty in modelling tax payments generated by the project, so is difficult to see why the same exactitude could not have been applied to benefits received from the government.

Perhaps the IIS omission of subsidy calculations relied, instead, on the argument that MIS and TCFA benefits were available to Gunns Ltd and the forestry industry, but not contingent on construction of the pulp mill. But again it is difficult to see how Section 8.4 restricts attention to contingent forms of assistance.

Treasury (2007) was also keen to avoid any quantitative estimates of subsidies to Gunns, and hence the pulp mill. To achieve this outcome, its advice to Minister Turnbull had it both ways.[19] On one hand it argued that only costs and subsidies contingent on construction of the pulp mill should be counted – or in other words the 'avoidable cost' logic of cost-benefit analysis, rather than the approach outlined in the section 8.4 of the RPDC guidelines – should apply. On the other hand, the same document argues that it was not possible to conduct a cost benefit analysis of the mill and that attention should focus on the viability of the mill – with the implication that section 8.4 should apply.

The CoPS model and Gunns IIS

Now turn to a description of the model used for the economic impact study included in Gunns IIS.[20] Known as the Monash Multi Regional Forecasting (MMRF) model, it is one of a number of models developed over the last 25 years by the Centre of Policy Studies (CoPS) at Monash University. During that time, CoPS has earned a strong international reputation in the area of computable general equilibrium modelling.

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[15] Taken from 'Forestlinks', Department of Agriculture, Fisheries and Forests, August 2007 (emphasis added).
[16] Gunns Annual Report, 2006-07 and Gunns Plantations Limited, *Newsletter*, Spring 2006.
[17] IIS, p.33.
[18] IIS, p.33
[19] Department of Treasury and Finance (2007).
[20] In this chapter, 'IIS' refers to the MMRF model-based report prepared for Gunns by the Allen Consulting Group (2006).

Tools of the CoPS kind comprise a large set of computer-coded algebraic equations which represents demands and supplies of both goods and services and labour for industries, households and the government, and the way in which these evolve over time. These models have undoubted strengths because they attempt to calculate impacts of major projects or policy changes in a consistent way – for example, the enforcement of budget and resource constraints ensures there is no double counting of costs and benefits. They offer a considerable advance over older input-output models because they incorporate the adjustment of firms and households to changes in relative prices, rates of return and incomes[21]. Nevertheless, it is important to ask whether the structure of the model, and the way in which the specific project was modelled, captured all the important economic aspects of the mill, and whether the model outputs met the RPDC guidelines.

The CoPS model describes[22]

- the output, demand for intermediate inputs, employment, and capital investment decisions of competitive firms. Firms are differentiated by industry (54 in CoPS-Green) and produce differentiated products (58). Each industry is disaggregated by State (8) and sub-State region (56);
- the spending and saving decisions of households. There is a single 'representative' household in each State, so the model is not intended to analyse income-distribution issues;
- the spending, taxation and budget balances of State and Federal governments;
- the response of real wages to deviations from the long run equilibrium rate of unemployment, and the determination of rates of return in the 54 industries in each State. Changes to these prices induce movements of labour between industries and/or States, and induce changes in the rate of investment in the State-specific industries. While productive capital equipment and agricultural land are assumed to be industry-specific, the model does not differentiate between different skill or occupational classifications of labour.
- international exports and imports of the 58 products (differentiated by State), together with the income flows consequent on changes in borrowing from abroad.
- the evolution over time of output, the stock of productive capital, and employment in each industry.

Modelling of this kind is computing- and data-intensive, and for users not familiar with the underlying specification it tends to be something of a 'black box' with heavy reliance placed on the good reputation of the CoPS modelling program. Basing an impact assessment on the CoPS model however, does not immunise users against the 'garbage in, garbage out' problem, or ensure that model outputs are interpreted in a useful way.

The starting point for the IIS is to transform the business plan for the mill into a time profile of industry and State-specific demands for additional capital investment, employment and for the outputs of other industries[23]. In turn, these changes to the input variables lead to changes in the output variables – model outputs represent the induced changes to the 'no pulp mill' or baseline case, which is typically a neutral scenario in which all industries and regions are growing at their long-run equilibrium rates.

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[21] It is now generally recognised that the older input-output approach to impact assessment tends to overstate the impact of new projects because it ignores the relevant resource and budget constraints, and so ignores the response to consequent changes in relative prices and rates of return.

[22] Parmenter et. al. (2001) and IIS, Appendix B provide more detailed descriptions of the MMRF model.

[23] See IIS, p.18. The business plan was not a public document. It does not appear to have been scrutinised in the peer review or the ITS Global report.

Now consider the changes that take place in the pulp mill case. In the first instance, increased demand for capital and labour needed to construct and operate the pulp mill is met by increased labour supply (in response to a higher real wage); increased supply of goods with which to produce the required capital equipment; and increased borrowing from abroad (which appreciates the real exchange rate).

These changes have knock-on effects to households, government, and to other industries. For example, appreciation of the exchange rate reduces profitability in industries exposed to international competition. Similarly, the rise in the real wage reduces profitability in labour-intensive industries. These 'crowding out' effects mean that, over time, a significant impact of the pulp mill is to attract resources away from other industries and/or States.

In the long run, this reallocation effect is almost the whole of the story as far as labour is concerned, because the long run equilibrium of the model is one in which total Australian employment reverts towards its baseline level. Employment in Tasmania rises, largely as a result of migration from the mainland – in the long run, the IIS model solution implies that 84 % of the increase in Tasmanian employment is satisfied by interstate migration[24]. Australian GDP is higher, however, because there is more installed capital in the long run. But the reallocation story is important here too. The entire rise in production occurs in Tasmania – by 2030 real Tasmanian Gross State Product is $675.8m higher than in the baseline, but in the rest of Australia, real GDP is $351.6m lower.

The Welfare Measure derived from the CoPS model

While the CoPS model provides a wealth of detail regarding the induced effects on various industries and regions, the bottom line in the impact assessment is 'are Tasmanian households better off'? The IIS welfare measure is based on the change in aggregate private consumption expenditure, and the IIS results indicate that in the long run this aggregate is 2.49 % higher in the 'with the mill' simulation than in the baseline case. However, many economists would argue that

- Government consumption expenditures yield private consumption benefits. In other words, publicly-provided consumption goods are a close substitute for some categories of private consumption expenditure. For example private health expenditures are a close substitute for publicly-provided health services; public and private expenditures on schools are close substitutes, and so on. So if an aggregate consumption measure is to be used to gauge welfare effects, it should be based on a measure which includes both welfare-enhancing components of consumption, rather than just private consumption expenditure by households.
- Per capita measures are a more relevant basis for welfare measurement than state-wide aggregates.

To calculate the impact of these two points, it is necessary to estimate the change in welfare-enhancing consumption and population from their baseline levels.

Consider the change in welfare-enhancing consumption first. Conservatively, assume half of general government consumption expenditure yields private consumption benefits. Then, based on national account data for 2005/06, private final consumption expenditure in is 85% of welfare-enhancing consumption.

The IIS assumes that there is no change to real government consumption expenditure, and IIS (Table C.1) indicates that in 2030 real private consumption expenditure is 2.49% higher than it otherwise would be, so the increase in welfare-enhancing consumption is 85% of this figure.

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[24] IIS, Table C2, p.56.

Now consider the change in population, which is related to the number of persons migrating from the mainland to Tasmania. In the CoPS model, the basic measure of the quantity of labour demanded is total hours worked. Other important quantities such as household disposable income (which determines the demand for housing, for example), are based on a measure of wage income which is, in turn, calculated by multiplying 'hours worked' by the hourly wage. While this might be regarded as a deficiency of the model, employment in terms of persons is essentially a memo item, albeit one which turns out to be important in discussing per capita measures of welfare. The average employment impact in the operating phase (2007-2030) is an increase in the number of hours of 2.0% over what it otherwise would be. The IIS assumes that of this increase in total hours worked, 0.7% is satisfied by an increase in the number of persons employed, and the remainder by an increase in the numbers of hours per worker.

This assumption is contentious. There may well be an increase in working hours during a period of intensive construction activity, but it is highly unlikely that this would be sustained in the long run, at least at a significant state-wide level. So a reasonable alternative assumption is that in the long run employment increases by the same proportion as the increase in hours.

Although the change in State population is not reported in the IIS it is reasonable to assume that by 2030 the State population will increase by roughly the same proportion as the increase in employment satisfied by interstate migration which, from the IIS, Table C.2, can be calculated as 84% of the total increase in Tasmanian employment in 2030.

Although both assumptions – the change in State population and the extent to which government consumption expenditure yield private consumption benefits – seem reasonable, they could be challenged. Using the CoPS model assumption as to the increase in employment numbers, the long-run change in per capita consumption is 1.5%; on a more reasonable long-run assumption, the per capita consumption benefit is just 0.43% higher than it would have been without the mill.

Peer Review

The peer review of the economic component of the IIS was undertaken by ACIL Tasman as a sub-contractor to Beca AMEC Limited. The ACIL Tasman report endorses the CoPS model as being appropriate for an impact assessment of this kind and, while it appears not to have scrutinised the underlying commercial-in-confidence project parameters, is generally supportive of the modelling assumptions. However, it notes that, while not likely to be sufficiently important to change to overall positive impact assessment provided by the IIS,

'The model could have been extended to include at least one alternative discount rate and alternative assumptions about renewable energy credits. These would have reduced the size of the estimated impacts but in ACIL Tasman's judgement they still would have been positive. The analysis could also have been extended to cover evaluations of environmental externalities (after allowing for their mitigation).'[25]

The first of the three issues noted above – the choice of discount rate – is often a contentious part of cost-benefit evaluation. The discount rate does not alter the actual stream of costs and benefits generated by the model – rather, it is important because any welfare evaluation needs to calculate the net present value, or the difference between the present value of the stream of benefits and costs. If costs are incurred early

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[25] Beca AMEC Limited (2006), p222.

in the life of the project, and benefits accrue later, it is possible for changes in the discount rate to change net present value from being positive to negative. Such a change would change the decision whether to accept or reject the project.

The discount rate is less important in an assessment of the kind included in the IIS, however, because it is not a cost-benefit study. All that is involved in the IIS is the present value of a sequence of positive numbers such as the model's solution for the annual increases in consumption expenditures. So, while different discount rates yield different present values, the present value will remain positive regardless of the choice of discount rate, and this is essentially the conclusion of the ITS Global review.

The second two points are not so easily dismissed. An important component of the mill is the plant generating electricity from biomass which, under the Mandatory Renewable Energy Target (MRET) scheme, is assumed to attract revenue from the sale of renewable energy certificates. The IIS estimates the impact of these sales on Gunns profits to be more than $33m per annum in real terms[26]. However as in the case of MIS schemes (which both the IIS and ITS Global excluded from consideration), MRET revenues are not subject to a contractual agreement with government. So the peer-review suggestion that the IIS results be evaluated against alternative assumptions for renewable energy certificates is important. It is not, however, even mentioned in the ITS Global review.

The third point is concerned with the economic evaluation of environmental externalities. This issue has been central to the public debate. For various reasons it has never been allowed to intrude into economic assessment process for the mill. In his expert witness statement to the RPDC Mr Jon Stanford, the Allen Consulting economist for the IIS, wrote

'We did not model the economic impact of any significant adverse environmental impacts because we were not advised that there would be any such impacts.'[27]

For the Tasmanian Treasury, the rationale for exclusion was different. Their argument, provided in a letter to Malcolm Turnbull, then Commonwealth Minister for the Environment and Water Resources, was that

'A formal cost:benefit analysis cannot be done for a major industrial project; that is, a quantification of all the externality costs and benefits to obtain a net present value of the project. Rather, assessment processes identify the major economic, environmental and social impacts of the project and if, the overall assessment is that the project is viable, the regulatory regime is then prepared to address potential risk and externality costs'.[28]

This position is at odds with best practice elsewhere, as various applied studies attest. A decision to allow private-sector construction of a nuclear power plant is a familiar classroom example. In that case environmental externalities are a central part of the economic impact assessment, and must be included in a formal cost-benefit study. Kennedy (2007) provides a recent example of this type of analysis in the UK. A second example is provided by the cost-benefit analysis of the Gordon-below-Franklin dam which, far from being too difficult, is used as a case study in the Commonwealth's *Handbook of Cost-Benefit Analysis*.[29]

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[26] This is a significant component of profits from the mill. The IIS assumes the $1.45b mill is debt-financed. The real interest rate assumed in the IIS is not reported, but assuming it is, say, 5%, the modelled real interest cost is $72.5m per annum. In other words, the assumed receipts from the sale of energy certificates cover around half the estimated interest cost.

[27] Stanford (2006), p.14.

[28] Department of Treasury and Finance (2007), p.6.

[29] Department of Finance and Administration (2006), ch.8.

A major problem with the Treasury position is that 'viability' (whether from the perspective of the private-sector proponent or society as a whole) is not independent of the costs of the regulatory regime. At the time of writing, for example, construction can proceed but operation of the mill is subject to Commonwealth approval for effluent disposal. If the Commonwealth minister assesses environmental externalities to be sufficiently large the regulatory regime may, in the end, require installation of a tertiary treatment plant costing several hundred million dollars. In that event, the Treasury position is silent as to who should bear this cost – is it the regulator or the proponent? If it is the latter, is the project still privately viable?

The ITS Global report

Following its withdrawal from the RPDC process, Premier Lennon decided that the assessment of the economic and social benefits of the mill pulp mill could be outsourced to a consultant. Whatever the merits of the argument regarding cost-benefit analysis, the brief prepared by the Department of Premier and Cabinet foreclosed the issue by omitting any reference to environmental issues. ITS Global, a firm specialising in international trade strategy, were awarded the $270,980 contract and in line with the brief, note that their report is not a cost-benefit analysis and that it does not assess any environmental issues[30].

The ITS Global consulting brief required it to review the project and to report on whether it would result in a net social and economic benefit for Tasmania. It was required to take into account materials provided to the RPDC by Gunns, the public and government agencies, as well as a CoPS study of an earlier mill proposal. It was left open to ITS Global to propose and conduct any additional research for the review. In the event, the review did not incorporate any additional research. As noted earlier, issues raised in the ACIL Tasman peer review were left to one side[31].

Issues raised in public submissions were similarly glossed over. One of these concerned risk. Edwards (2007), for example, argued that volatility in the world price for pulp exposed the Tasmanian economy to a degree of volatility (through Forestry wood supply contracts and other interactions between the mill and the wider economy) that should be considered in the assessment. Others argued that the assumptions in the Jaakko Pöyry business plan for the mill should be subject to a sensitivity analysis.

On the latter point, it is difficult to overstate the extent to which assumptions made by consultants, using essentially the same model, can lead to radically different outcomes. A graphic illustration is provided by comparing two assessments of Gunns pulp mill – the Centre of Policy Studies (CoPS) report prepared for the Tasmanian Treasury in 2004, and the Gunns IIS report, also based on the CoPS model, but prepared 18 months later. Both these reports analyse the impact of a pulp mill on the Bell Bay site, with construction spread over a three year period (2005 to 2007 in the first case, and 2007 to 2009 in the second). The three-year sequences of construction costs are given in the first row of Table 1, and model-generated outcomes for the change in Tasmanian consumption, investment and employment are given in the next three rows.

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[30] ITS Global (2007), p.8.
[31] Although not available to ITS Global at the time, the review prepared for the Commonwealth Minister for the Environment and Water Resources also raised 'a number of areas of potential concern regarding robustness of the results', some of which had been highlighted in public submissions. See Department of the Environment and Water Resources (2007).

Table 1 Construction-period impacts from two studies based on the CoPS model.						
	Treasury report			Gunns IIS report		
	2005	2006	2007	2007	2008	2009
Construction Investment ($m)	100	500	400	435	870	145
Real Consumption ($m)	202	1052.3	468.4	105.9	231.5	162.1
Real Investment ($m)	254.4	1198.1	697.6	509.5	1066.9	285.7
Employment (thousand persons)	1.7	8.4	2.1	1.7	3.4	1.4

Source: Centre of Policy Studies (2004), Table 2; IIS (2006), Table C2
Note: Data for the CoPS study are expressed in 2001 prices; data for the IIS study are expressed in 2005 prices.

The construction-cost profiles differ slightly in the two reports, and so some differences in model outcomes can be expected. The model-generated outcomes are, however, significantly different[32]. Compare these results over the three-year construction period:

- In the first report, a cumulative investment of $1b generates a cumulative increase in consumption of more than $1.7b; in the second report, a cumulative investment of $1.45b generates a cumulative increase in consumption of just $0.5b. In other words the 'consumption multiplier' in the first report is *five times* as large as in the second.
- In the first report, the $1b investment generates a peak-period increase of 8.4 thousand jobs; in the second report, with a larger investment, the peak-period increase in employment is 3.4 thousand jobs. The employment multiplier is *three and half times* as large in the first report as in the second.
- In the first report the induced increases in consumption and investment are roughly the same; in the second report the investment response is up to *five times* as large as for consumption.

Clearly, these differences are large, and one might have expected the assessment process to provide an explanation as to how the CoPS model could generate such markedly different results. ITS Global took both studies into account, as required by the consulting brief. In a 116-page report, its comparative analysis of the two studies is recorded in a single sentence, noting that

'Although the two assessments used somewhat different assumptions – notably for the timing and length of the assessment period as well as the construction and operating costs of the mill – they obtained *broadly similar* results.'[33]

 A common tactic adopted by the government boosters of the mill was to dismiss the arguments of the sceptics, on the grounds that they were based on uncertain or speculative data. No doubt claims made by the sceptics were subject to uncertainty, but the boosters' tactic glossed over the uncomfortable reality that the same applies to CoPS results. This uncertainty, or risk, is of two types – what I will describe as 'model' uncertainty and 'assumption' uncertainty.

Consider model uncertainty first. The CoPS model is credible, well-documented, and is widely used in impact assessment. However it is based on estimates of a very large number of parameters, each of which is subject to its own uncertainty. It is standard practice in econometrics, and recommended practice in cost-benefit studies and business planning, to

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[32] Table 1 provides comparative results over the three-year construction period. However, the long-run results are also markedly different. For example in the 2004 study the long-run percentage increase in consumption is twice as large as the long run increase in Gross State Product; in the 2006 study, these two variables increase by virtually the same percentage.
[33] ITS Global (2007), p23, emphasis added.

recognise this uncertainty by presenting results as lying within upper and lower confidence limits[34]. In realistic applications these calculations can be complex but are nevertheless essential if users are to judge the degree of uncertainty around model outputs, and to judge how uncertainty about particular parameters, which may be important in specific applications, affects the overall result.[35] It is not yet standard practice in CoPS modelling, but the methodology for applying this approach analytically was developed twenty years ago; with the development of more powerful computers similar results can be obtained using Monte Carlo techniques.[36] In the absence of this information the IIS must be regarded as providing 'best estimate' outputs from the CoPS model, but users are given no guidance as to the width of the confidence bands surrounding these estimates.

Now turn to 'assumption uncertainty'. This relates to the assumptions which must, of necessity, be made about inputs into the model. In preparing the IIS, analysts will have made a number of these, including assumptions

- required to translate the business plan for the mill, prepared by Jaakko Pöyry, into a form which can be represented in terms of variables in the model,
- about external conditions such as the world real interest rate, world prices and demand for paper pulp and woodchips, and the distribution of profits from the mill,
- about the proportion of the construction workforce initially located in Tasmania, and the proportion satisfied by migration,
- as to how much of the labour input is satisfied by an increase in hours, and how much is satisfied by an increase in the number of people employed.

Many of these assumptions involve uncertainty. The job of the analyst is to make judgements about the most likely outcomes, and to present them in a transparent way. The point is not to criticise the fact that one has to make assumptions in order to generate solutions from CoPS-type models – that is an inevitable part of the analysis. The issue is, rather, that a review of the IIS might reasonably have been expected to provide some assessment of whether the assumptions were reasonable and the sensitivity of model results to changes in assumptions.

I have discussed the ITS Global review at some length because it was, in a sense, a substitute for the public hearings which would have taken place had the RPDC process been adhered to. Although the reviewer was able to enquire into the underlying modelling assumptions, or to propose that additional research be carried out, it did not do so. Instead, the review amounted to little more than a summary of public submissions to the RPDC and a lengthy restatement of the conclusions drawn by the IIS. Inevitably, given that the IIS is not a cost-benefit analysis, it came to the conclusion that the net benefits of the project were positive.

National Institute Review

Legislation for the pulp mill permit had passed the Tasmanian parliament by August 2007, and Commonwealth minister Turnbull had given conditional approval for the mill in the last weeks of the 2007 federal election campaign. So the report of the National Institute of

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[34] See for example, ch.9 of Campbell and Brown (2003), which is a standard reference on cost-benefit analysis.

[35] An everyday example might help to illustrate the point. Suppose I go to the hardware store to buy paint, but I am uncertain both as to the dimensions of the area to be painted and the porosity of the surface, which determines the required number of coats of paint. Although the calculation is straightforward the number of tins to buy is uncertain. If I am sure I need only two coats, it is uncertainty as to the area that matters; but if I measured the area exactly the purchase is only sensitive to the assumed number of coats.

[36] See Pagan and Shannon (1985, 1987).

Economic and Social Research, which appeared in January 2008, was too late to have much impact on the debate.

The model on which this report is based is not as well documented (at least in the public domain) as the CoPS model on which the IIS and ITS Global reports are based. So it is difficult to make an assessment as to the reliability of the results, which showed no net benefits from the pulp mill. However, the model is notable for its attempt to include, in a probabilistic way, costs of adverse external outcomes identified by Edwards (2007) and the Round Table for Sustainable Industry (2007) that were not included in these earlier studies.

Conclusion

From the time of Lara Giddings' launch of the pulp mill task force in August 2004 the IIS, the peer reviews and the ITS Global report all failed to quantify *any* costs or subsidies associated with the viability of the mill, monitoring of outcomes, or consequential infrastructure costs. Similarly, these reports were unable to quantify a single dollar of prospective externality costs.

By fast-tracking the process and excluding considerations detailed in section 8.4 of the RPDC assessment guidelines, the government promoted an assessment methodology which could produce only one result – that the mill would increase household consumption spending and gross state product. The only question of interest was the size of these effects. But even with this blinkered approach, which puts the economic outcomes in the best possible light, the benefits were meagre. Drawing on the analysis of this paper, results reported in the IIS suggest that welfare-enhancing per capita consumption was likely to be less than half a percentage point higher than it would have been without the mill.

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