Review of Tarrawonga Coal Project Socio-Economic Assessment

Prepared by

Economists at Large Pty Ltd

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Report prepared by:

Economists at Large Pty Ltd
Melbourne, Australia
www.ecolarge.com
info@ecolarge.com

Phone: +61 3 9005 0154 | Fax: +61 3 8080 1604
98 Gertrude St, Fitzroy VIC 3065, Melbourne, Australia

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Introduction

Background

The proposed Tarrawonga Coal Project is for the continuation of an open-cut mine into agricultural land and the Leard State Forest, Narrabri Shire, NSW. The proposal is for a 17-year open cut mine which will produce up to 3 megatonnes of coal per year. The proponent is currently seeking planning approval and has prepared an Environmental Assessment.

The Tarrawonga project is one of several mining proposals or mine extension projects in this traditionally agricultural area. Local community group, the Maules Creek Community Council (MCCC) is concerned that the proposed projects will affect agriculture, the community and the Leard State Forest, which contains nationally threatened ecosystems and species. Many communities in Australia are facing similar issues and are concerned that the often-touted benefits of the mining boom may be overstated and/or not accruing to local people.

This submission

The MCCC is making a submission on the Tarrawonga Environmenal Assessment. As part of their submission they have asked Economists at Large to review *Appendix M – Socio-Economic Assessment*. We consider there are a number of very significant issues in the economic assessment, which, without being addressed, would render the assessment unsuitable to contribute to decision-making. These issues are:

- **Scope of the assessment** Particularly relating to:
  - **Benefits accruing to Australia and overseas**
  - **Greenhouse gas emissions**
  - **Consideration of alternatives**
- **External costs and benefits.** Many are inappropriately given a zero value, and we offer further comment on
  - **Health impacts**
  - **Social value of employment**
- **Inappropriate use of input-output modelling in impact assessment**
- **Transparency of calculations**

We believe that all these issues need to be clarified and adjustments made to the economic assessment of the project to ensure a decision is made in line with the NSW public interest. Doing so would not only allow for the best outcome in relation to this project, but could serve as a guide for other projects in the area and nationally.

This is occurring at a time when the mining industry is perceived as lacking a "social licence to operate" in farming areas. Conflicts between farming communities and coal and coal seam gas developments are making headlines regularly, with farmers and the broader community losing confidence that such developments are in the community's best interests. Robust and transparent assessment of this project could help to address this issue.

Scope of analysis

The importance of setting the scope of a cost benefit analysis and remaining consistent with this scope cannot be overstated. As Eggert (2001) makes clear:

> *Let us now turn to … issues that challenge and bedevil practitioners of social benefit-cost analysis. The first challenge is deciding "whose benefits and costs count" …. It sometimes is called the issue of standing--that is, who has standing in the analysis of benefits and costs? This is an issue of scope. Should the analysis include only those costs and benefits affecting residents of the local community? The state or province? The nation? The world? Whether the net benefits of a project are positive or negative often depends on how narrow or broad the scope of the study is.* (p27)

The cost benefit analysis in the socio-economic assessment is carried out at a national level. This is an appropriate scope, however some shortcomings remain.

Benefits accruing to Australia and overseas

Profits of the project that accrue to overseas interests should not be included as a benefit in this cost benefit analysis, as confirmed by Bennett (2011)

> *Where the shareholders are not citizens, their mine benefits are expatriated and should not be included in the BCA. Careful attention should therefore be given to the register of shareholders and adjustments made to the producer surplus benefit calculation.* p3

This has been acknowledged in the socio-economic assessment on p17:

> *Overall the Project is estimated to have net benefits of $1,116M. Based on current ownership and tax structures, it is estimated that $790M of these benefits would flow to Australia.*

How this estimate has been made is unclear from the socio-economic assessment. We believe it is unacceptable for one of the most important calculations in the cost benefit analysis to be presented with no discussion of methodology, working or sources.

The owners of the project are:

> *Whitehaven Coal Mining Pty Ltd (Whitehaven) (70% interest) and Boggabri Coal Pty Ltd (BCPL) (a wholly owned subsidiary of Idemitsu Australia Resources Pty Ltd) (30% interest).* P1

Analysis by the MCCC suggests that Whitehaven is 80% foreign owned, while Idemitsu Australia is wholly owned by Idemitsu Japan[1]:

[1] http://www.idemitsu.com.au/

Owners	Nationality	Stake (%)
Hans Mende	USA	15.96
Mende, Hans & Ingrid	USA	14.16
AMCI International AG	USA/ Switzerland	11.32
AMCI Group	USA	9.7
Fritz Kundrun	USA	14.04
FRC Whitehaven	Netherlands	14.69
Total		79.87

Source: www.etrade.com.au date 21.12.2011

In total this means 86% of the Tarrawonga project is foreign-owned, yet the reduction in net present benefits from $1,116m to $790m represents an adjustment of only 30%. Any adjustment that affects the value of the project by over $300m should be transparently explained to the public. We urge the proponents to explain this figure transparently, which would significantly improve the public's understanding of distribution of benefits at zero extra cost.

The acknowledgement in this socio-economic assessment of the effects of foreign ownership is an improvement on other assessments such as Gillespie Economics (2010) and Gillespie Economics (2011), however throughout the socio-economic assessment, the unadjusted figure – which is of little interest to decision makers or the public – is referred to more prominently than the more relevant Australian figure. The assessment should be revised to emphasise the correct figure.

This point is also important for the neighbouring Boggabri Coal Project proposal, which is 100% owned by Idemitsu. We made the same point in submissions relating to that project and look forward to a similar correction.

Greenhouse Gas emissions

The socio-economic assessment makes no consideration of downstream greenhouse gas from coal combustion:

> *This is based on pragmatic grounds as well as the view that projects should be assessed from the view point of the nation which undertakes the projects, incurs the costs and is responsible for decision-making.*(p8)

The assumption that the end user of the coal - most likely a power station in China or India - will conduct transparent cost benefit analysis at all seems optimistic. The real problem arises, however, with the logical conclusion that the Chinese and Indian economists will take the same approach and fail to consider any GHG cost borne outside their jurisdiction – China or India. Let's consider the cost benefit analysis of such a power station in more detail:

			Included in national level CBA?
Benefits	Financial	The revenue paid to the power station from users of its electricity	Yes
	Externalities	"There may also be external benefits of electricity for economic development, education and medical care." Note that these would accrue to any type of electricity generation, not only coal.	Yes
Costs	Financial	Capital and operating costs	Yes
	Externalities	Reduced air quality, health impacts, acid rain, etc	Yes
		Climate change impacts	No – at least not those that accrue to other countries

The omission of this externality from both the cost benefit analysis of the mine and the power station results in an external cost borne by the rest of the world. The size of this externality is significant and demonstrated with even basic calculations:

Item	unit	value	Source
Coal production	tonnes/year	3,000,000	Appendix M
Mine life	years	17	Appendix M
Total output over mine life	tonnes	51,000,000	Ecolarge calculation
Coal to CO2 production ratio	ratio	3.0	Submission by Dr Ian Lowe to Boggabri Coal EIS[2]
Total C02 produced	tonnes	153,000,000	Ecolarge calculation
C02 price	dollars	30	Appendix M
Total damage	dollars	4,590,000,000	Ecolarge calculation
Present value (17 years, 7%)	dollars	2,636,070,208	Ecolarge calculation

The existence of a $2.6 billion (present value) externality that is not internalised by either the coal producing or consuming country means that the world bears this loss; neither the mine nor the power plant is likely to be economically efficient in light of this cost. Keeping this cost external is the unfortunate truth on which the profitability of coal mining and coal-fired power generation industries is largely based.

Alternative projects

The socio-economic assessment includes consideration of only two alternatives, with project and without project scenarios, and some discussion of minor alterations in section 2.7. The assessment claims that more alternatives are described in detail in section 6.9.1 of the EA. However section 6.9.1 tells us that open cut mining methods were chosen "based on TCPL's corporate objectives" (p6-37). The point of this socio-economic assessment is to evaluate the project from the perspective

[2] Available at http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=3562

of the Australian public, not from TCPL's perspective. The national scope of the assessment is made clear. As such, adequate consideration of the community's preferred alternative – an underground mine – must be made in the economic assessment.

Note that a neighbouring coal project, the Boggabri Mine Extension Project, owned by Idemitsu Australia, did engage consultants to analyse an underground mining option, WDS Consulting (2009). WDS concluded that underground mining was both technically feasible and economically viable. In depth calculations of the underground option were not included in the cost-benefit analysis of the Boggabri Mine as:

> *At the request of Idemitsu, a full financial analysis was not within* [the consultant's] *deliverable scope. Our primary financial deliverables, … are to be integrated into Idemitsu cost models for internal economic analysis.* (WDS 2009, p7-1)

Economists at Large reviewed WDS's work and conducted basic financial analysis of the data presented. We concluded that the profitability of the underground as presented in the WDS study was $500 million greater than that of the preferred option presented in the Boggabri Coal Project Economic Assessment (also by Gillespie Economics).

Table 1 Underground and open cut mining options for Boggabri Coal Project

	Boggabri Coal Project Environmental Assessment Appendix C - Underground option ($m)	Boggabri Coal Project Environmental Assessment Appendix Q - Economic assessment (open cut mining option) ($m)
Revenue	$3,730	$5,343
Other production benefits	NA	$54
Capital costs	$652	$778
Operating costs	$1,288	$3,328
Other production costs	NA	$25
NPV	$1,790	$1,266

Source: Campbell (2011)

Gillespie Economics' rationale for not including a viable underground option in their cost benefit analysis of the Boggabri Mine was that "*alternatives need to be **feasible** to the proponent*" (bold in original) (Gillespie, 2011). But cost benefit analysis of the Tarrawonga project is required to consider the benefits for the Australian community. As underground mining in the area has been found to be economically viable, the cost benefit analysis must consider how this option would affect the welfare of the Australian community.

External costs and benefits

If all external costs can be internalised by an offset programme then there is no need to estimate their values. This is reason that the Socio-Economic Assessment assigns zero values to most of the external costs arising from the project, as listed in table 2.2 (p15). However, the allocation of a zero value, with no consideration of risk, ignores the debate between physical scientists as to what extent these offsets are achievable. See for example the debates between specialists over the neighbouring Maules Creek Coal Project:

- ViPAC (2011) who question the findings of the environmental assessment's air quality study
- Water Resources Australia (2011) who dispute the findings of the environmental assessment's groundwater study

We suggest it is beyond the expertise of Gillespie Economics to adjudicate in these debates between physical scientists. The allocation of zero values to these external costs is just such a judgement. When the necessary revisions are made to the Socio-Economic Assessment, we also recommend the proponents take note of Curtis (2011), who estimates the value of the ecosystem goods and services lost due to the clearing of the Leard State Forest at some $490,000 per annum. Curtis also urges analysis of land values to consider losses of amenity and social value to the community. Curtis's background as a physical scientist, land economist and ecological economist gives his findings considerable weight.

These issues are of particular concern to the local community as all these values affect particularly the local community. We urge better quantification of the distribution of costs and benefits of the project to the local community, rather than the box ticking exercise shown in table 2.3 (p16). This table completely fails to demonstrate the risks and costs the community faces while looking to gain minimal shares of the benefits.

In addition to the uncertainty around most external values, two others are worth further comment.

- Health impacts
- Social value of employment

Health Impacts

The cost benefit analysis makes no mention of the impacts on human health of open-cut coal mining and transportation, despite this issue garnering considerable attention in the region, the media and academic writing. External impacts such as health can be measured and quantified in economic terms, as pointed out in Gillespie and James (2002):

[C]*ertain kinds of social impacts, such as social dislocation or adverse health effects, may be partially appraised in monetary terms.* (p21)

Such appraisal would be assisted by a recent NSW Department of Health report looking at morbidity and mortality in regions of the Hunter Valley affected by mining (NSW Health 2010a). They found that the regions in the Hunter most affected by mining have higher rates of emergency department attendances for asthma and other respiratory conditions; hospital admissions for respiratory

conditions and cardiovascular disease and mortality due to cardiovascular disease and all cause mortality. Analysis of presentations to GPs also suggested higher rates of asthma and other respiratory conditions in communities affected by mining, although not statistically significant (NSW Health 2010b).

There are significant limitations to these studies, including that they do not adequately take account of other population factors affecting health in these areas, and that the number of people in the affected areas are small, making comparisons difficult. However, both studies confirm the work of others, showing that exposure to pollutants, particularly particulate matter is an important causative factor in respiratory and cardiovascular disease. It is also well recognised that there is no threshold level for negative health impacts of particulate pollution. There will be people affected by particulate air pollution and this must be acknowledged.

Air monitoring data from the mines in the Hunter region revealed high levels of PM10 particles in a number of sites (NSW Department of Environment, Climate Change and Water 2010). However, as acknowledged by the Dept of Health, there is insufficient monitoring in populated areas. If those data were available, this would enable a better prediction of the cumulative health impact of the mining activities in the region (NSW Health 2010a).

In the USA quantification of the health impacts of coal is more advanced. Epstein et al (2011) estimate that the cost of lives lost in the Appalachian mining region in the US is US$74.6 billion per year. This builds on other studies such as Hendryx and Ahern (2009) who found "[a]ge-adjusted mortality rates were higher every year from 1979 through 2005 in Appalachian coal mining areas compared with other areas of Appalachia or the nation" (p.547). Hendryx and Ahern also refer to past research on coal mining regions that found elevated levels of chronic heart, respiratory, and kidney disease, and lung cancer, after control for socioeconomic factors. They found that the health impacts far outweighed the economic benefits of mines.

While it is difficult to extrapolate the health impacts of coal mining in the USA to the Australian setting due to different mining practices and different pollutant levels, there are a range of health impacts that can be extrapolated directly. These include particulate air pollution (with the level of impact being dependent on the level of pollution), noise, traffic, social and mental health impacts (Castleden et al 2011).

With long-term, empirical evidence linking significant health impacts to coal mining, it is important that the costs associated with impacts are included in consideration of this project. Clearly these are costs that accrue to the local and NSW community and should be included in the assessment.

Social value of employment

The values claimed as social value of employment are misleading. We have argued this in submissions on the Boggabri Coal Project and Maules Creek Coal Project. The proponents of the Maules Creek Coal Project commissioned Professor Jeff Bennett of the Australian National University

to review the economic assessment of that project, also by Gillespie Economics, which also included a "social value of employment". In relation to the inclusion of this value, Professor Bennett said:

> [The] *EIA's inclusion of benefits associated with employment* [is contentious]. *The argument advanced is that people outside of the mine workforce enjoy benefits associated with people having jobs in the mine. The values of this 'existence benefit' of work estimated for the case of a mine in the southern coal field are 'transferred' to the current case. A number of points argue against this approach. First, there is a conceptual issue. In a fully employed economy, it is doubtful that people employed in the new mine would be drawn from the ranks of the unemployed. So people outside the mine are unlikely to hold any existence benefits for the jobs provided by the mine in that case. Second, there is an estimation issue concerning the use of a benefit estimate transferred from another context. The conditions in the southern coalfield – the context of the source of the benefit estimate are very different from the proposed mine context…..* [The] *inclusion of the employment benefit as a component of the EIA is not recommended. Their inclusion would overstate the extent of proposal benefits.* (Bennett 2011)

These are the words of one of Australia's most senior academic economists and the lead author of one of the papers Gillespie Economics cite to justify their inclusion of this value. As even Professor Bennett has failed to dissuade Gillespie Economics from including this value, it is hard to imagine who or what might succeed. We call on Gillespie Economics to desist from including this discredited value in their work entirely.

Input-output modelling in Economic Impact Assessment

The use of input-output modelling in the economic impact assessment section of the socio-economic assessment creates a misleading impression of the impacts of the project. Input-output modelling has fallen from favour with economists for many reasons, the main ones being explained by the Australian Bureau of Statistics(ABS 2011):

> ***Lack of supply–side constraints:*** *The most significant limitation of* [input-output modelling] *is the implicit assumption that the economy has no supply–side constraints. That is, it is assumed that extra output can be produced in one area without taking resources away from other activities, thus overstating economic impacts. The actual impact is likely to be dependent on the extent to which the economy is operating at or near capacity.*
>
> ***Fixed prices****: Constraints on the availability of inputs, such as skilled labour, require prices to act as a rationing device. In assessments using multipliers, where factors of production are assumed to be limitless, this rationing response is assumed not to occur. Prices are assumed to be unaffected by policy and any crowding out effects are not captured.*

These limitations are obvious to the local community, who experience difficulties accessing tradesmen and other services. These shortcomings are also becoming obvious to other sectors of the economy, particularly manufacturing and agriculture, as they struggle with the downside of the mining boom. Yet this obvious downside is ignored by input-output modelling. As (Abelson 2011) put it:

> *I–O models lack resource constraints and fail to capture significant welfare (consumer and environmental) impacts. They always produce a positive gain to the economy, however disastrous the event.*

Had the socio-economic assessment used more appropriate methods, such as general equilibrium modelling, the benign impacts on other sectors shown in table 3.5 (p30) would look different. Instead of showing modest growth in employment of other industries, we would see that expansion of mining operations, particularly in a tight labour market, has a negative effect on other industries.

This point is reinforced by economic analysis of the China First Coal Project in Queensland, carried out for the proponents of that mine using computable general equilibrium modelling**.** AEC group (2010) found that not only would that mine not carry social value of employment, but that proceeding with that project in the current labour market was likely to result in the loss of significant numbers of jobs in the agriculture and manufacturing industries. Compare these results to those obtained through input-output modelling:

Mine Project	Forecast impact on manufacturing employment	Forecast impact on agricultural employment
Tarrawonga	14	1
Maules Creek	11	3
Boggabri	119	15
Maules Creek area total	**+144**	**+19**
China First	**-2215**	**-192**

Sources: Tarrawonga Coal proposal socio-economic assessment, Gillespie Economics 2010, Gillespie Economics 2011, AEC Group 2011.

While the China First Project is larger than the Maules Creek, Tarrawonga and Boggabri proposals combined, this comparison shows the differences between modelling methods. While general equilibrium modelling, with its more realistic assumptions shows that the China First Project will destroy thousands of jobs in agriculture and manufacturing, the input-output modelling of the Maules Creek area projects, with its lack of resource constraints and price changes, suggests an increase in employment.

We urge the NSW government to consider the wider effects of mining projects on other industries and the economy, which would be assisted by requiring more realistic modelling in economic impact assessment.

Transparency of calculations

Major values presented in the Socio-Economic Assessment Table 2.2 (p15) do not correspond with values presented in the rest of the assessment. We have calculated the present values of operating costs and revenue from values presented on pages 6 and 7 of the assessment. These values vary by over $1 billion with those presented in table 2.2 and are summarised below.

Table 4 Comparison of revenue and operating cost calculations

	Table 2.2	Calculated from text	Difference
Revenue ($M)	2,569	3,596	1,027
Operating costs ($M)	1,319	1,785	466

The point of this comparison is not to suggest that project is more valuable than was presented, but to show that the public can have no confidence in the figures presented. We urge the proponents to explain how they arrived at their present value figures and to publish their full working and modelling, as we have done in the appendix. The background to these calculations are not commercially sensitive and they could be included at no extra cost to consultants. Not explaining them serves only to weaken public confidence in their analysis. Our calculations follow standard methodology and were reviewed by several practicing economists, none of whom could reconcile the difference between the figures.

Conclusion

The socio-economic assessment of the Tarrawonga Coal Project is not suitable for decision making in its current form. It fails to clearly demonstrate the economic benefits of the project to Australia, much less the local community. Transparency regarding the calculation of benefits to Australia is crucial if the public is to have any faith in this assessment. At a global scale the vast damage from downstream emissions suggest the project is economically unjustifiable, while at a local level problems such as:

- lack of consideration of underground alternatives,
- no quantification of most external costs and risks, and
- consideration of health impacts

also bring the efficiency of the project into doubt.

Methodological flaws such as inclusion or reference to social benefits of employment and misleading use of input-output modelling need to be revised before the assessment can inform decision making around this project. Transparent reporting of calculations and assumptions is also required to improve the usefulness of this document.

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Appendix – present value calculations

Tarr Mine Revenue & Costs

	Unit	Value	Page	Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Annual Operating Costs	$AUD M	574	6	0	0	0	0	224	224	224	224	224	224	224	224	224	224	224	224	224	224	224	224	224
Annual Coal Production	Mtpa		9	0	0.0	0.0	0.0	3.0	3.0	3.0	3.0	3	3	3	3	3	3	3	3	3	3	3	3	3
Thermal Coal Price	$AUD/t	102	7																					
Semi-soft Coking Coal Price	$AUD/t	161	7																					
Weighted Price?	$AUD/t	150.4	6																					
Annual Revenue	$AUD M			-	-	-	-	451	451	451	451	451	451	451	451	451	451	451	451	451	451	451	451	451
Discount Rate		7.0%	15																					
Present Value OpCosts	$AUD M			-	-	-	-	171	160	149	139	130	122	114	106	99	93	87	81	76	71	66	62	58
Total PV OpCosts	$AUD M	1,785																						
Present Value Revenue	$AUD M			-	-	-	-	344	322	301	281	263	245	229	214	200	187	175	164	153	143	133	125	117
Total PV Revenue	$AUD M	3,596																						

***Year 0 is 2013**